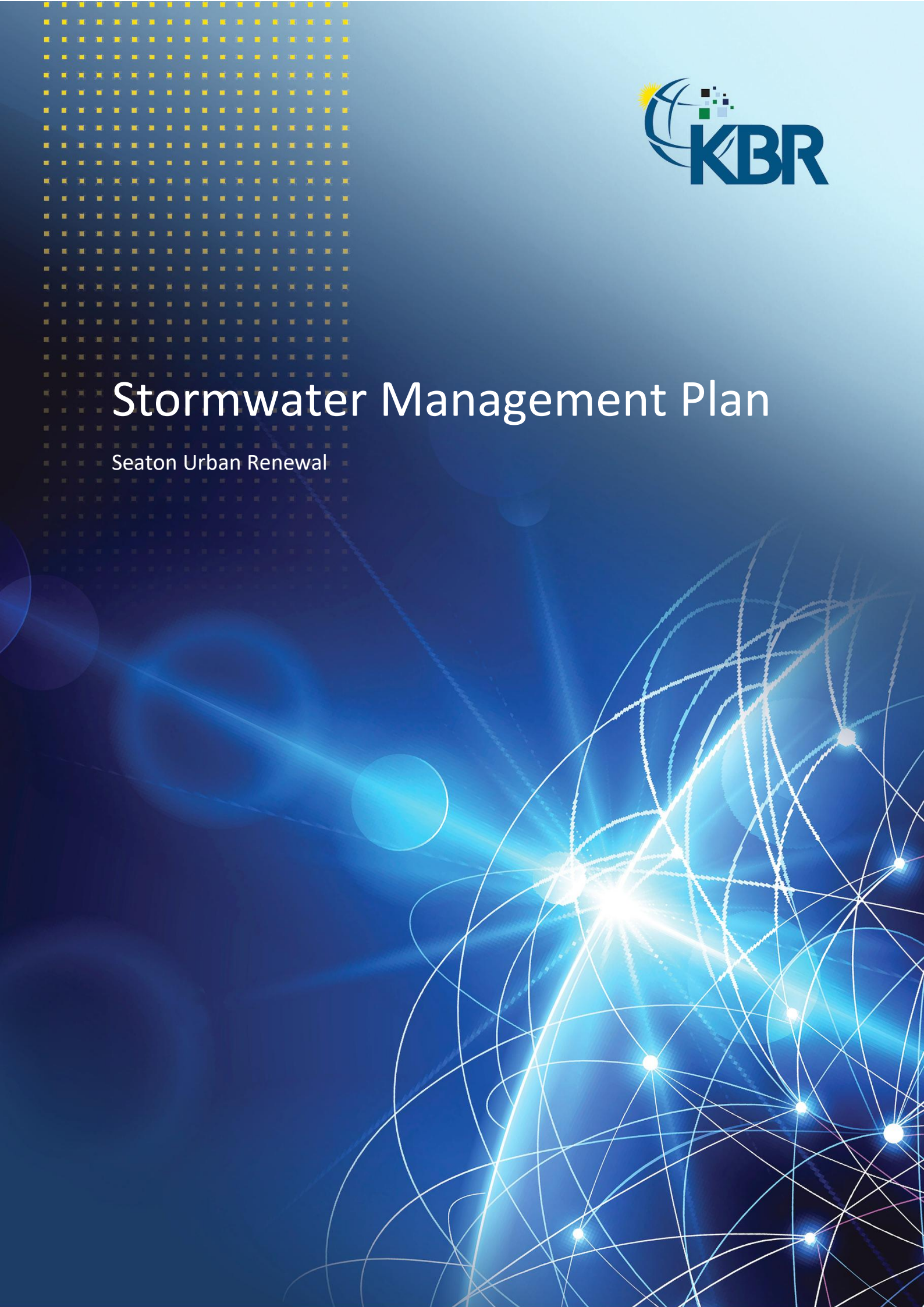
Stormwater Management Plan

Seaton Urban Renewal



Stormwater Management Plan

Seaton Urban Renewal

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Acknowledgments

KBR acknowledges the Traditional Custodians throughout Australia and their continuing connection to land, water, culture and community, and pays respect to their Elders past and present.

Limitations Statement

The sole purpose of this report and the associated services performed by Kellogg Brown & Root Pty Ltd (KBR) is to prepare a stormwater management plan for the Seaton Urban Renewal Project in accordance with the scope of services set out in the contract between KBR and Renewal SA('the Client'). That scope of services was defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

The findings, observations and conclusions expressed by KBR in this report are not, and should not be considered, an opinion concerning the capacity of existing drainage infrastructure external to the project site..

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between KBR and the Client. KBR accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

Revision History

Revision	Date	Comment	Signatures			
			Originated by	Checked by	Technical Approval	Project Approval
A	17/04/2025	Issue for Approval	K. Li			M. Page
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			Kelly Li			Mwp

Contents

Section		Page
CONTENTS		**1**
1	**PROJECT BACKGROUND**	**2**
1.1	Introduction	2
2	**EXISTING DATA REVIEW**	**4**
2.1	Site Topography	4
2.2	Existing Stormwater Infrastructrue	5
2.3	Point of Discharge	5
2.4	Flood mapping	6
3	**DESIGN REQUIREMENTS**	**7**
3.1	Legislation/standards/guidelines	7
3.2	Design Objectives	7
3.3	Items not considered	8
4	**DESIGN BASIS**	**9**
4.1	Design Basis – Drainage	9
4.2	Design Assumptions	11
4.3	Hydrological Data	12
4.4	MUSIC meteorological temporal file	13
4.5	Design Software	13
5	**STORMWATER QUANTITY**	**14**
5.1	Pre-development	14
5.2	Post-development	20
5.3	Discussion	26
6	**STORMWATER QUALITY**	**28**
6.1	MUSIC Modelling and Results	28
7	**CONCLUSION**	**31**
7.1	Summary	31
7.2	Outstanding Items and Further Work	31
8	**REFERENCES**	**32**
APPENDIX A: PROPOSED DRAINAGE LAYOUT PLAN		
APPENDIX B: CATCHMENT PLAN		
APPENDIX C: DRAINS INPUT AND OUTPUT		

1 Project Background

1.1 INTRODUCTION

KBR have been engaged by Renewal SA to complete a Stormwater Management Plan (SMP) for the Seaton Urban Renewal Project, refer Figure 1-1 below for site location. Renewal SA, in partnership with the South Australian Housing Trust will deliver this revitalisation. Seaton urban renewal project consists of stages of development over the existing established community, incorporating approximately 1400 new affordable affordable and social housing and 12.5% new public open space.

The stormwater management plan (SMP) has been developed to assess the proposed new development and ensure that the development meets all its regulatory requirements, is in line with relevant Australian Standards and City of Charles Sturt (Council) Infrastructure guidelines and generally does not cause any adverse effects due to stormwater to the surrounding areas, including the existing buildings, road, infrastructure and existing Council stormwater infrastructure.



Figure 1-1 Seaton Renewal Project Location (Source: Google Map)

KBR have developed this SMP on behalf of Renewal SA and is to be issued to the City of Charles Sturt as a part of the development approval process.

This report presents a stormwater strategy for the proposed development to collect, convey, detain, treat, and ultimately discharge the stormwater for the development site such that Council and other regulatory site requirements are met.

To show compliance to the site requirements the report will:

- Obtain and review existing data relating to the proposed development and surrounds, including:
  - Existing survey
  - Existing Council stormwater infrastructure
  - Existing Council flood studies
  - Existing stormwater management plans
  - Proposed future developments by Councils and/or other developers
- Determine relevant legislation, and Council requirements for the proposed site.
- Determine and assumptions advice regarding hydrological calculations.
- Analysis pre-development and post development stormwater management by:
  - Determining pre-development and post development catchments
  - Determining pre-development and post development flow paths both minor and major
  - Using the hydraulic software DRAINS to determine the following, pre and post development:
    i Site stormwater peak flow
    ii Identify the need for site detention and size to ensure peaks flow from the site is not increased due to the development
    iii Hydraulic grade lines (i.e. water levels) at pits
  - Using software program MUSIC (Model for Urban Stormwater Improvement Conceptualisation) to determine that water quality targets are in line with applicable Water Sensitive Urban guidelines

This report will not investigate, upgrade, or make good any existing Council stormwater infrastructure outside the site of the proposed development including located on the site within easements. Moreover, the study does not provide a detailed analysis of any existing stormwater drainage deficiencies or upgrades that would be required for the pre-development catchment to meet current best practice drainage standards.

2 Existing Data Review

2.1 SITE TOPOGRAPHY

KBR has conducted a desktop study over the following available information:

- Elvis Elevation Foundation Spatial Data (https://elevation.fsdf.org.au/)
- Location SA Map Viewer
- Alexander Symonds Seaton Detail & Level Survey – Matthews Avenue, Lake Avenue, Glenburnie Street & Frederick Road, Revision J, December 16th, 2024.
- City of Charles Sturt Council asset plan (via DYDB on December 10th, 2024).
- City of Charles Sturt historical drainage design drawings

It has been identified that:

- The existing site is relatively flat with approximately 0.2% fall from northeast to southwest.
- Pedlar Street is graded from east to west, there is a 825RCP trunk main transitioning into a 1.2x0.75 RCBC under Pedlar Street running from east to west discharging at West Lakes via Brebner Drive. It conveys runoffs from approximately half of the project site as well as flows from external catchment east to the project site.
- Glenburnie Street is also graded from east to west. Overland flows along Glenburnie Street appears to travel further south along Frederick Road after exiting Glenburnie Street. Council's asset plan suggests there is a 900RCP/1.35x0.67RCPC trunk main running parallel along the road from east to west, which ultimately discharges to a series of RCPs within Federick Road. This trunk main conveys flow from half of the development site and flows from external catchments east and south to the development site.
- Frederick Road surface is graded from north to south. Both Council's asset plan and Location SA Map Viewer suggest that, in between Glenburnie Street and Pedlar Street, there are two 600RCPs and a 750RCP running in parallel from south to north under Frederick Road. It captures the overland flows along Frederick Road, and it also conveys the flows from eastern catchments.
- Three key low points were found, and all are located at the upstream of existing drainage networks and are subject to inundation during 1% AEP storm event.
    i. Survey suggests there is a low spot at the cul-de-sac end of Lark Avenue. A single-side-entry pit is provided at this location to drain road surface runoffs as well as discharges from surrounding allotments. Council's flood map shows the ponding depth varies between 300-500mm during 1% AEP storm event at this spot.
    ii. The western end of Harris Place is pooling with water during 1% AEP storm event. Council's flood plain map for 1% AEP storm event suggests that this spot and the aforementioned low spot at Lark Avenue cul-de-sac act effectively as one large low point and are prone to flooding during major storm events, with maximum flood depth up to 520mm, refer Figure 2-2.
    iii. The low spot at Matthew Avenue/Lark Avenue roundabout appears to be inundated during 1% AEP storm event, with ponding depth ranges between 100-300mm, refer Figure 2-2.

2.2 EXISTING STORMWATER INFRASTRUCTRUE

Based on Location SA Map Viewer and City of Charles Sturt Asset Plan, the following existing Council stormwater infrastructure have been identified within the project site, refer Figure 2-1 for layout of the existing Council stormwater mains.

- *Pedlar Street stormwater main:* 825RCP/1.2x0.75 RCBC trunk main running east to west under Pedlar Street. Starting from Tapleys Hill Road, this trunk main conveys flows from external eastern catchment as well as flows from site northern catchments. It continues to run to the west beyond the site western boundary and finally discharges at West Lakes. Based on historical drawings provided by Council, this trunk main is approximately 1.2m below ground level and running at an average of 0.09% longitudinal grade.
- *Glenburnie Street stormwater main:* 900RCP/1.35x0.675 RCBC trunk main running from east to west under Glenburnie Street. It carries flows from eastern external catchment as well as flows from site southern catchments. This trunk main discharges to a series of RCPs under Frederick Road.
- *Frederick Road stormwater main:* 2x600RCP and 1x750RCP trunk main running south to north under Frederick Road. It starts from Glenburnie Street, carrying flows from site southern catchments as well as external eastern catchments, and meet the Pedlar 1.2x0.75RCBC trunk main at Pedlar Street/Frederick Road intersection.



Figure 2-1 Existing Stormwater Infrastructure (Source: Location SA Map Viewer)

2.3 POINT OF DISCHARGE

The Frederick Road trunk main and Pedlar Street trunk main meet at Pedlar Street/Frederick Road intersection and then converge into a 1.2x0.75 RCBC trunk main travelling towards the west along Brebner Drive eventually discharging at West Lakes. West Lakes is considered to be the final point of discharge.

Note that overflows along Glenburnie Street appear to travel further south along Frederick Road. This overflow will be included in calculating the total discharge from redevelopment site in both pre-development and post-development conditions.

2.4 FLOOD MAPPING

City of Charles Sturt online flood plain maps provide access to 1% AEP storm flood maps as well as flooding depth during 1% AEP storm at various locations as shown in Figure 2-2.

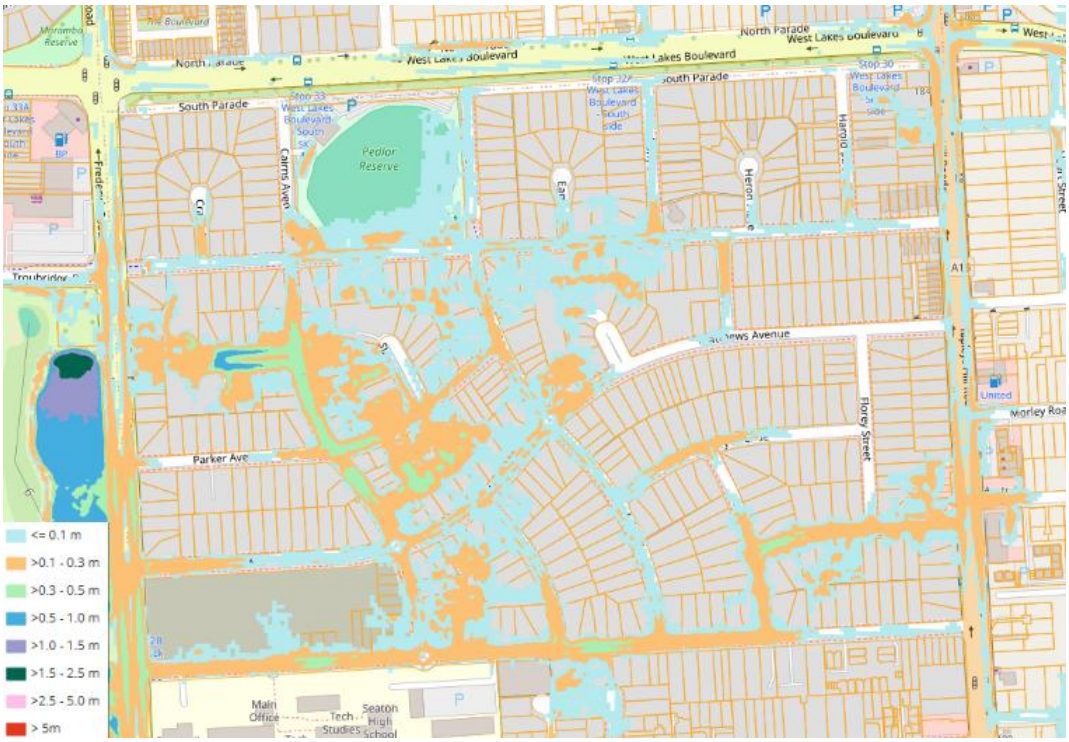


Figure 2-2 City of Charles Sturt 1% AEP storm flood plain maps (Source: City of Charles Sturt, 2024, https://www.charlessturt.sa.gov.au/development-and-infrastructure/infrastructure/floodplain-mapping)

Some areas within Redevelopment Stage 3, 12a, 12b, 10, 11 are affected by flooding during 1% AEP storm, with a majority having a flood depth in the range between 100mm to 300mm. The low spot at Harris Place western end is severely inundated during 1% AEP storm, with the maximum flood depth up to 520mm.

3 Design Requirements

3.1 LEGISLATION/STANDARDS/GUIDELINES

Legislative requirements, Australian standards and Engineering guidelines that govern the proposed development works include:

- City of Charles Sturt Infrastructure Guidelines, Revision 4, October 2019.
- Argue, 1986, Stormwater Drainage Design in Small Urban Catchments: A handbook for Australian Practice, Australian Road Research Board, SR34.
- Australian Rainfall and Runoff, 2019.
- Australian Standard AS/NZS 3500.3 (2019) Stormwater drainage.
- Queensland Urban Drainage Manual.
- Austroads design guideline Part 5: Drainage – General and Hydrology Considerations.
- Austroads design guideline Part 5A: Drainage – Road Surface, Networks, Basins and Subsurfaces.
- Austroads design guideline Part 5B: Drainage – Open Channels, Culverts and Floodway Crossings.
- DIT Master Specification RD-DK-D1 Road Drainage Design, September 2024.
- South Australian MUSIC Guidelines.

3.2 DESIGN OBJECTIVES

3.2.1 Stormwater Quantity

The stormwater drainage outcomes that the design intends to achieve includes:

- For minor storm event (1 in 5-year ARI):
  - Peak flow not increased at the point of discharge (or point of interest) in a 5-year ARI storm event (0.2EY).
  - Flows shall be fully contained in the proposed underground stormwater network without surcharging. Provide minimum 150mm freeboard where practical.
- For major storm event (1 in 100-year ARI):
  - Peak flow not increased at the point of discharge (or point of interest) in a 100-year ARI storm event (1% AEP).
  - All flows for major storms shall be fully contained within the Council Road reserve.
  - All overland flow routes shall be identified and a minimum of 150mm freeboard from all flood levels shall be provided to all Finished Floor Levels to buildings and dwellings.

3.2.2 Stormwater Quality

Incorporating best practice water quality measures to reduce the impact of the contaminated runoff such that it meets the following requirements as outlined in the City of Charles Sturt Infrastructure Guidelines:

- 90% Total Gross Pollutants (kg/yr) Removed

- 80% Total Suspended Solids (kg/yr) Removed
- 60% Total Phosphorus(kg/yr) Removed
- 45% Total Nitrogen (kg/yr) Removed

3.3 ITEMS NOT CONSIDERED

Several items will not be considered within this scope of work, these include:

- Size and adequacy of existing downstream City of Charles Sturt network to convey pre-development flow.
- Future increased impervious area in existing external catchments from the project site.
- Increased rainfall intensities and stormwater flows resulting from climate change.
- Potential clashes between proposed drainage pipe and existing utilities. This will be investigated and included in detailed design drawings for each stage, i.e. service relocations, service removals etc.

4 Design Basis

4.1 DESIGN BASIS – DRAINAGE

The design standards and references used for the stormwater design as shown in Table 4-1.

Further to *Section 3.1 Legislation/Standards/Guidelines*, see the following design basis items extracted from the applicable standards and guidelines.

The City of Charles Sturt Council guidelines is used as the primary design basis for this project as the City of Charles Sturt are the end asset owner for the infrastructure.

The following reference documents and Stormwater Management Plan were used to formulate the stormwater design basis and assumptions for Seaton Project:

- Environmental Assessment – West Lakes Assessment Stage 1 (EPA, July 2021)
- West Lakes Catchment Stormwater Management Plan (Tonkin, April 26th, 2022)
- Western Adelaide Region Climate Change Adaption Plan (Tonkin, February 2018)

Table 4-1 Stormwater Design Basis

Criteria	Design criteria	Reference	Comment
Major Storm Event	100-year ARI (1% AEP Storm Event)	City of Charles Sturt Infrastructure Guidelines	
Minor Storm Event	5-year ARI (0.2EY Storm Event)	City of Charles Sturt Infrastructure Guidelines	
Freeboard	Major Storm – Flows to be contained within road reserve and minimum 150mm to FFL of dwellings	City of Charles Sturt Infrastructure Guidelines	In all major storms, all overflow routes shall ensure flows are contained within the road reserve and achieve a minimum of 150mm freeboard from all flood levels shall be provided to all Finished Floor Levels (FFL) to buildings and dwellings.
	Minor storm – 150 mm freeboard between maximum HGL and pit surface level	City of Charles Sturt Infrastructure Guidelines	Minimum 150 mm free board desirable between peak pit HGL and pit surface level / kerb water table level.
Flow width	Maximum 2.5m during 0.2EY storm event	DIT Master Specification RD-DK-D1 Road Drainage Design, Table 10-1	City of Charles Sturt Council Infrastructure Guideline does not specify flow width requirement. As a general best practise, propose to adopt maximum 2.5m flow width during 0.2EY storm event.
Blockage Factors	0.5 sag pits 0.2 on-grade pits	ARR 2019	
Detention Requirements	Post development flows not exceeding predevelopment flow	City of Charles Sturt	Standard requirements from City of Charles Sturt Infrastructure Guideline requires the post

Criteria	Design criteria	Reference	Comment
	rates in the minor and major storm events	Infrastructure Guidelines	development peak flows during 1% AEP event storm to be detained under its pre-development 0.2EY storm event discharge. This detention requirement will require significant detention storage for Seaton project. After liaison with Council, it was agreed that the post-development discharge to be detained under its pre-development level during major and minor storm event respectively. This was the design basis of Stage 1 of the development and justified due to the catchment's close proximity to West Lakes.
Pit types	City of Charles Sturt SEP and Junction box as primary design pit types	City of Charles Sturt standard details	Refer to the drawings for more details
Pipe size / material	All stormwater drainage pipes in public areas shall be Class 4 Steel reinforced concrete pipe with a minimum diameter of 375mm, connected using Rubber Ring Joint.	City of Charles Sturt Infrastructure Guidelines	
Tailwater Level	-0.3 mAHD	Environmental Assessment – West Lakes Assessment Area Stage 1 – EPA, July 2021, Section 3.2.4	West Lake is a man-made lake, the tidal inflow is controlled to maintain water level in the lake at approximately -0.3 mAHD
Catchment characteristics for residential allotment	Varies	DIT Master Specification RD-DK-D1 Road Drainage Design, Table 8-1	Refer Table 4-2.
Stormwater Drain Location	All stormwater drainage shall be located within the road pavement with a distance of 1.0 - 1.5m from the face of the kerb.	City of Charles Sturt Infrastructure Guidelines	All design efforts shall made to minimize tight angles of entry into pits or junction boxes and where this is not possible, additional pits or junction boxes shall be incorporated into the design. Pipes/pits shall be constructed at a location where they can be accessed for maintenance without restrictions.

Surface parameters for different types of land use that were adopted for hydraulic modelling is shown in Table 4-2.

The existing residential allotments within the project site are largely former SA Housing trust dwellings which were constructed decades ago.

There are three different categories among the existing dwellings, determining the surface parameters to be adopted for hydraulic modelling.

- *South Australia Housing Authority (SAHA) Dwellings:* These existing dwellings are owned by SAHA, and they tend to have more grassed area compared with private properties. Measurement from aerial image justifies that the average proportions of roofed area, supplementary area, and paved area for SAHA allotment are 20%, 5%, 75%. These existing SAHA dwellings will be acquired and converted into high density dwellings after development.
- *Privately Owned Dwellings:* A majority of existing private properties have a site area in the range between 500 m^2 to 700 m^2. DIT Master Specification RD-DK-D1 Road Drainage Design Gude Table 8-1 suggest 60% paved area, 15% supplementary area, and a 25% grassed area for residential allotment with site area in the range above. Based on aerial image, measurement of five randomly picked allotments in the site area confirmed the proportion for paved/supplementary/pervious area as per above.
- *South Australia Housing Authority (SAHA) Refurbished Dwellings:* These are existing SAHA dwellings which are newer construction and therefore excluded from the renewal project. The surface characteristics of these allotments resemble those of private properties.

Proposed development allotments consist of new developed dwellings and apartments. The new developed dwellings are smaller in size, with allotment on average less than 300 m^2. DIT Master Specification RD-DK-D1 Road Drainage Design Guide Table 8-1 suggests such an allotment to have 80% paved area, 10% supplementary area, 10% grassed area.

Table 4-2 Land Use Catchment Parameters

Dwelling Type	Roof/Paved Area (%)	Supplementary Area (%)	Grassed Area (%)
Privately Owned Dwellings (retained)	60%	15%	25%
South Australia Housing Authority (SAHA) Refurbished Dwellings (retained and excluded from the redevelopment project)	60%	15%	25%
South Australia Housing Authority (SAHA) Dwellings (newer construction excluded from the redevelopment project)	20%	5%	75%
Developed Allotments	80%	10%	10%
Apartment sites	100%	0%	0%
Road Reserve	100%	0%	0%
Open Space / Parklands	0%	0%	100%

4.2 DESIGN ASSUMPTIONS

The design assumes the following:

- In absence of detailed site survey, the invert levels of the trunk mains remain unknown. Design assumes the invert levels of the trunk main at various locations based *on Alexander Symonds Seaton Detail & Level Survey – Matthews Avenue, Lake Avenue, Glenburnie Street & Frederick Road, Revision J, December 16th, 2024,* and Council historical drawings to inform the input into DRAINS model.
- The conditions of the existing stormwater infrastructure are unknown, based on Council's historical design drawings, the existing Council stormwater infrastructure was constructed circa 60 years ago. Design assumes all current stormwater infrastructure are functional and are in a good state without affecting its hydraulic performance.

- According to Section 3.2.4 *Environmental Assessment – West Lakes Assessment Area Stage 1,* water level in West Lake can vary if there is a sudden increase or reduction of flow. For instance, a large stormwater flow into the Lake or reduction of flow within the Lake during a recreational event, causing the water level at West Lake to be higher or lower than its targeted control level -0.3 mAHD. However, variance of water levels in West Lake due to these events are considered to be temporary, water level will eventually return to its targeted control level at -0.3 mAHD. From hydraulic performance perspective, the influence of water level variance due to these events is considered to be marginal, hence will not be modelled in DRAINS.
- Council's 1% AEP flood map suggests that some areas in the upstream 'External Catchment 2' and 'External Catchment 3' are subject to flooding during major storm event, refer Figure 4-1. The surface ponding provides a storage volume for upstream catchments, which will reduce the flows received by downstream pipes. Based on the area of flooding as shown in the Council 1% AEP flood map and the flooding depth, the surface storage volume for upstream external 'External Catchment 2' is estimated to be 6950m^3, and for upstream 'External Catchment 3' is estimated to be 6750 m^3. Sag pits with the aforementioned storage volumes are modelled in DRAINS for these external catchments for both pre-development and post-development scenarios simulating the surface ponding storage during 1% AEP storm event.

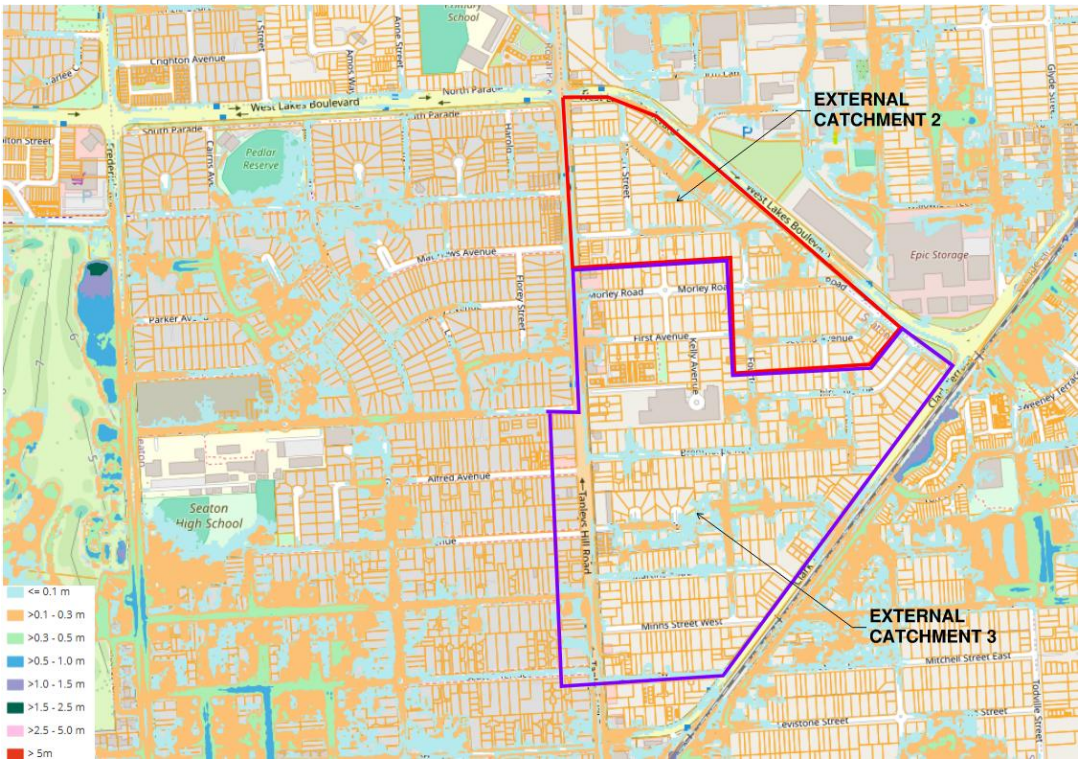


Figure 4-1 External Catchment Extents

4.3 HYDROLOGICAL DATA

Rainfall data for Seaton Urban Renewal was obtained from the Australian Rainfall and Runoff (ARR) data hub and Bureau of Meteorology (BoM). This data has been used for all storm events.

In line with *West Lake Catchment Storm Water Management Plan 2022*, an Initial Loss- Continuing Loss (CL-IL) DRAINS model was set up with input parameters detailed in Table 4-3

Refer Table 4-3 to for all hydrological design parameters used in DRAINS modelling.

Table 4-3 Adopted ILSAX DRAINS Model Parameters

Parameter	Value	Standard	Comment
Impervious Area Initial Loss (mm)	1	DRAINS Manual	
Impervious Area Continuing Loss (mm/hr)	0	DRAINS Manual	
Pervious Area Initial Loss (mm)	45	DIT Master Specification RD-DK-D1 Road Drainage Design Section 8.5 c)	
Pervious Area Continuing Loss (mm/hr)	3	DIT Master Specification RD-DK-D1 Road Drainage Design Section 8.5 c)	
Pit Blockage Factor	0.5/0.2	Austroads Part 5A Section 5.5.3	For sag pit, use 0.5 For on-grade pit, use 0.2
Time of Concentration (Tc)	Varies	DRAINS Content File	For catchments located within Project site, Paved area– 5min Supplementary area – 2 min Grassed area – 10 min For External Catchments, time of concentration is assessed on a case-by-case basis, refer Section 5.1 for details.

4.4 MUSIC METEOROLOGICAL TEMPORAL FILE

MUSIC requires meteorological template as primary input. It consists of both rainfall data and potential evapotranspiration data.

- *Rainfall data:* According to South Australia MUSIC Guideline Figure 3.3 and Table 3.1, Seaton falls in 'Adelaide Dry' region, where the nearest rainfall station is Parafield Airport rainfall station, therefore, Parafield Airport (station number 023013) was selected as the most suitable rainfall data for the proposed redevelopment. Rainfall data was recorded in 6-minute time-steps for a period of approximately 10 years (31 January 2000 to 31 January 2010).
- *Potential Evapotranspiration data:* Adelaide monthly average areal potential Evapotranspiration (mm/month) was selected from the MUSIC v6.3.0.1908 default data base.

4.5 DESIGN SOFTWARE

- DRAINS (Full unsteady hydraulic model): to model the associated drainage infrastructure as well as overland flow routes of the site for the minor and major events in consideration of the storage effect in the overflow route. DRAINS Version 2023.11.8726.15750 (64 bit) - 22 Nov 2023.
- MUSIC v6.3.0.1908: to model the stormwater quality treatment trains.
- AutoCAD 2024: to determine catchment areas for pre/post development.

5 Stormwater Quantity

5.1 PRE-DEVELOPMENT

The existing project site is predominantly covered by residential allotments (85.36%) with a small portion of road area (12.53%) and a Reserve (2.12%) north of Pedlar Street.

Size and location of existing drainage pits and pipes are derived from City of Charles Sturt asset plan. In addition, the current kerb & gutter survey shows invert levels of existing sub-drains at certain locations, assisting to formalise the pre-development hydraulic model. Areas which are prone to flooding during major storm events, including Stages 2, 3, 10, 12a and 12b, were examined in greater details, with sub-catchment defined and assigned to each individual pits in those areas.

Refer to Appendix B for the pre-development catchment plan.

5.1.1 External Catchments

Location SA Viewer suggests that there are upstream drainage networks, east and south to the project site, discharging flows from eastern and southern external catchments to Pedlar Street trunk main and Glenburnie Street trunk main.

The eastern and southern external catchments were determined by location of the upstream drainage networks and site contours from Elvis data. Measurement of road area and residential allotment area were taken based on aerial image, to form the design input for hydraulic model.

Time of Concentration (T_c) for external Catchments were determined using Figure 5.4-Flow travel time in channels from *Storm drainage design in small urban catchments* by John Argue, by measuring the longest flow distance (m) and fall of channel (m), summarized in Table 5-1.

Table 5-1 Details of External Catchments

Catchment	Location	Size (ha)	Tc for Impervious Area (min)	Tc for Pervious Area (min)
External Catchment 1	North	3.300	10	25
External Catchment 2	North-east	14.130	27	42
External Catchment 3	South-east	35.03	27	42
External Catchment 4	South	4.233	18	33

5.1.2 DRAINS Modelling/Results

Pre-development DRAINS modelling, input and output are attached under Appendix C, with result of peak flows at key locations summarized in Table 5-2.

Table 5-2 Pre-development DRAINS model results for major and minor storm event

Discharge Point	Peak Flow (m^3/s) at Point of Discharge	
	Minor Storm Event (0.2EY)	Major Storm Event (1% AEP)
Pedlar Street trunk main flow (total flow including pipe flow from Glenburnie Street)	1.24	1.69
Pedlar Street trunk main overflow	0	0.09

Discharge Point	Peak Flow (m³/s) at Point of Discharge	
Glenburnie Street overland flow	0.01	2.14
Total Discharge	1.25	3.92

Flooding was observed at three low spots in pre-development condition during both major and minor storm event. All three pits identified are located in the sag points in the upstream of the drainage network, refer Table 5-3 for the maximum ponding RLs from pre-development DRAINS. The model results are comparable to flood maps for both the 1% AEP and 0.2EY flood map. The ponding is typically caused by inundation of downstream drainage network or that the existing pipe is insufficient to convey the flow.

Table 5-3 Ponding RL (mAHD) and ponding depth (m) for pits located in areas prone to flood

Pit Name in DRAINS	Pit 2	Pit 10	Pit 44
Location	At western end of Harris Place	Cul-de-sac on Lark Avenue	Matthews Avenue/Larke Avene Roundabout
Existing Surface RL (mAHD)	2.16	2.31	2.59
Ponding RL during 0.2EY storm event (mAHD)	2.38	2.57	2.70
Ponding depth at 0.2EY Storm event (mm)	220	260	110
Ponding RL during 1% AEP storm event (mAHD)	2.82	2.82	2.82
Ponding depth at 1% AEP Storm event (mm)	660	510	230

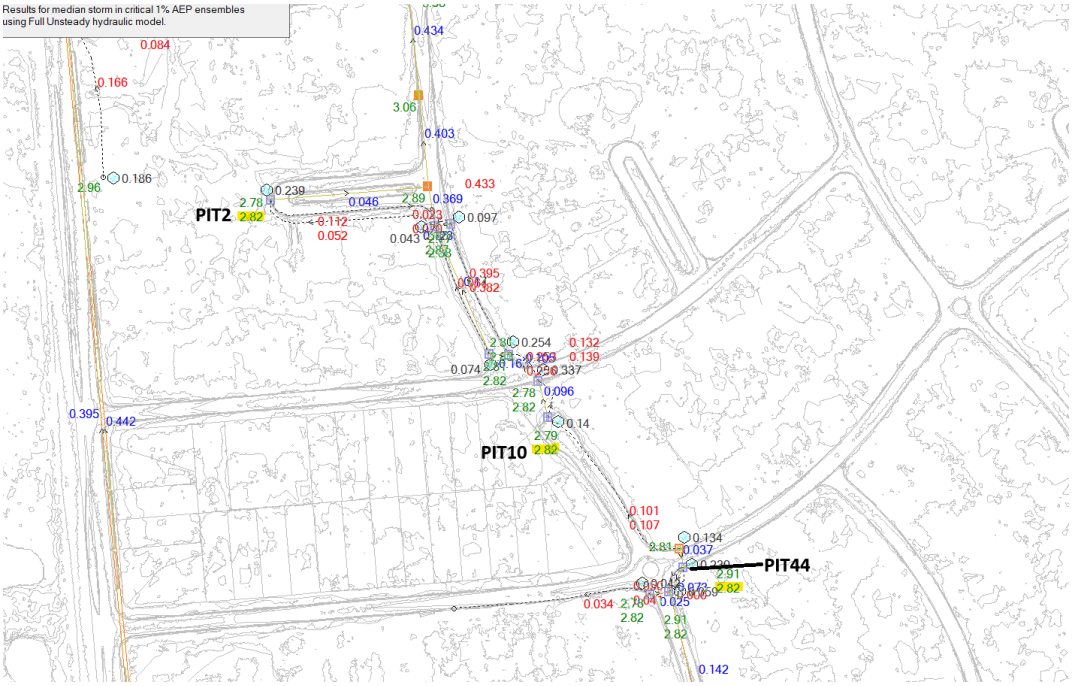


Figure 5-1 Pit ponding RL (mAHD) during 1% AEP storm event

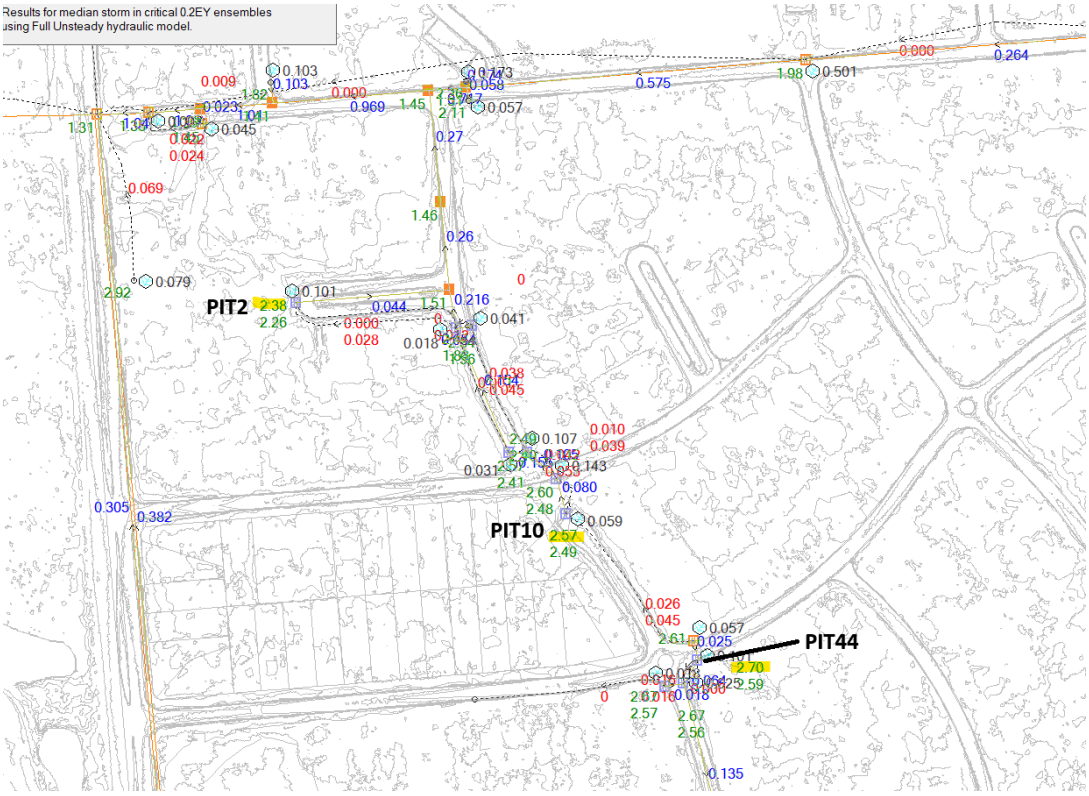


Figure 5-2 Pit Ponding RL (mAHD) during 0.2EY storm event

Details of key observations at the key low point locations and the downstream drainage network includes:

Childs Avenue 375/750RCP stormwater main (Pit 2 and Pit 10)

This stormwater main starts from the single side-entry pit at the end of cul-de-sac on Lark Avenue and then run parallel with Childs Avenue to the north, eventually discharging to the Pedlar Street stormwater main.

The upstream pipe reaches are 375RCP with average slope of 0.3% which then transitions into 750RCP with 0.09% fall at a side-entry pit south to Harris Place. Refer Figure 5-3, the Long Section of this existing drain indicates that the upstream pit has a very shallow invert, with only 113 mm cover (from pipe obvert to surface level), making this location susceptible to flooding.

Harris Place grades from Childs Avenue to the west. The SEP at the western end of Harris Place then conveys water back to the 750RCP in Childs Avenue. This results in significant existing flooding issues and ponding depths within Harris Place.

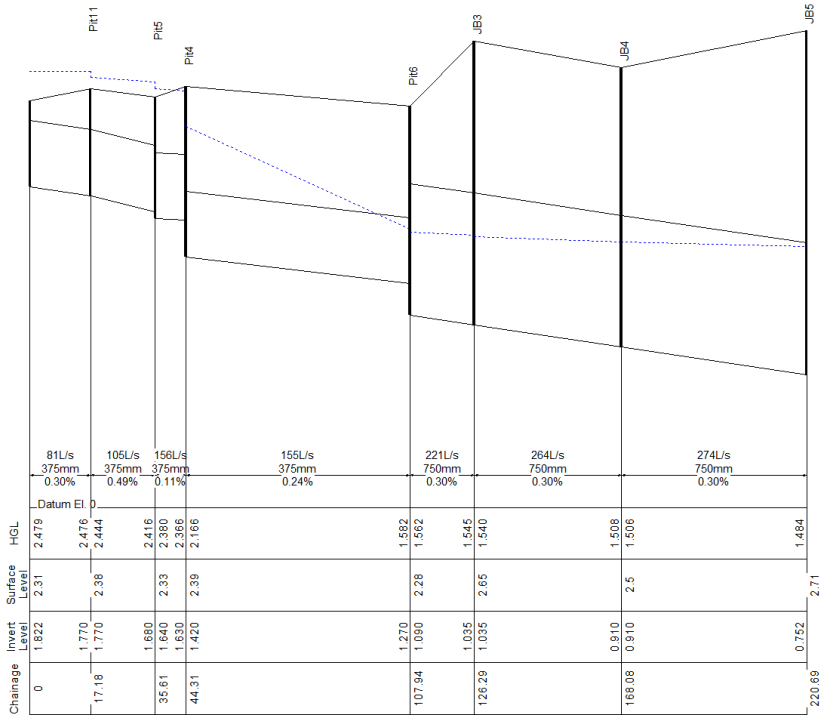


Figure 5-3 375/750RCP stormwater main under Childs Avenue during 0.2EY storm event (from the upstream cul-de-sac pit 10 to JB5 on Pedlar Street)

Some gaps and inconsistencies of invert levels are found throughout the existing drain, which may reduce the drainage capacity of the network. 0.2EY event results show that the upstream HGL level remains high, pipe overflows are observed during 0.2EY storm event, which is currently non-compliant with the Council requirements.

It is noted that within Council's historical drawings there appears to be several iterations of augmentation and upgrades of the existing drain in Childs Avenue, presumably to mitigate ongoing drainage issues.

Lark Avenue 375RCP stormwater main (Pit 44)

This drain starts from the roundabout at Matthews Avenue/Lark Avenue, and runs in parallel with Lark Avenue to south, eventually discharging to Glenburnie stormwater main.

The upstream of this drain is consisted of several side entry pits located near the roundabout, connected by 450x225 RCBCs. The subdrains then merge into a 375RCP.

Refer Figure 5-4 for long section of this drain during pre-development minor storm event.

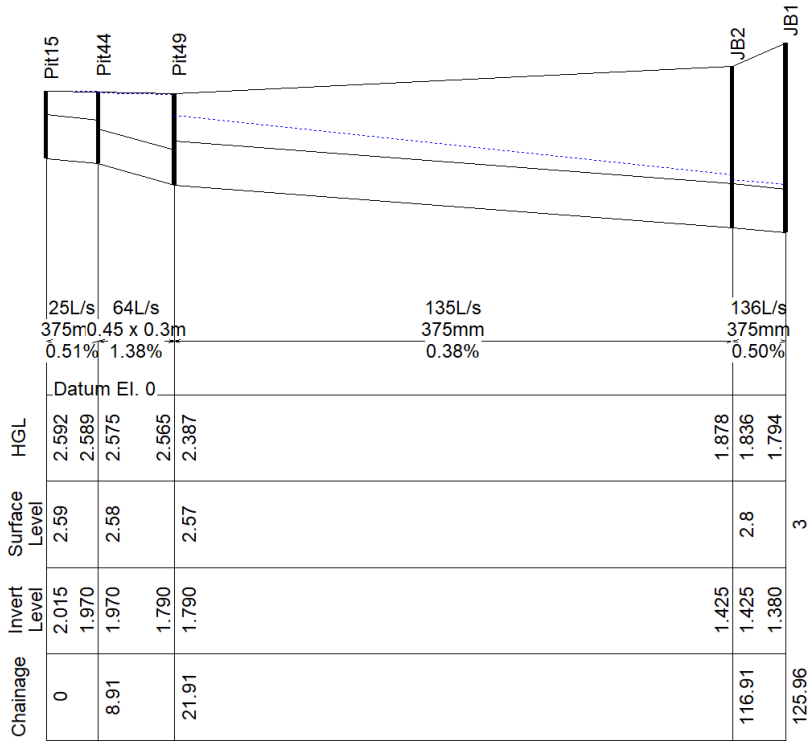


Figure 5-4 375RCP stormwater main under Lark Avenue during 0.2EY storm event (from upstream pit15 to JB1 on Glenburnie Street)

The upstream of this stormwater run is very shallow, with only 240mm cover. Pre-development 0.2EY event results suggest that pit and pipe overflows are observed in the upstream side entry pits near the roundabout. This could be attributed to the insufficient capacity of the existing drain, making the upstream sag location currently non-compliant with council requirements.

Overland flows along Pedlar Street, Glenburnie Street during 1% AEP Storm

Overland flow paths within the Seaton Development grade toward either Pedlar or Glenburnie Streets which provide the key overland flow route from east to west through the development.

Pedlar Street and Glenburnie Street typical cross section geometry was input into DRAINS. Road capacity check was conducted for predevelopment 1% AEP storm event. Critical road overland profiles are shown in Figure 5-5 and Figure 5-6.

For both these key flow paths within the development, it is concluded that the overland flows are largely contained within the road reserve in the predevelopment major storm event, with only minor encroachment of stormwater levels beyond property boundaries. This is consistent with the available flood mapping.

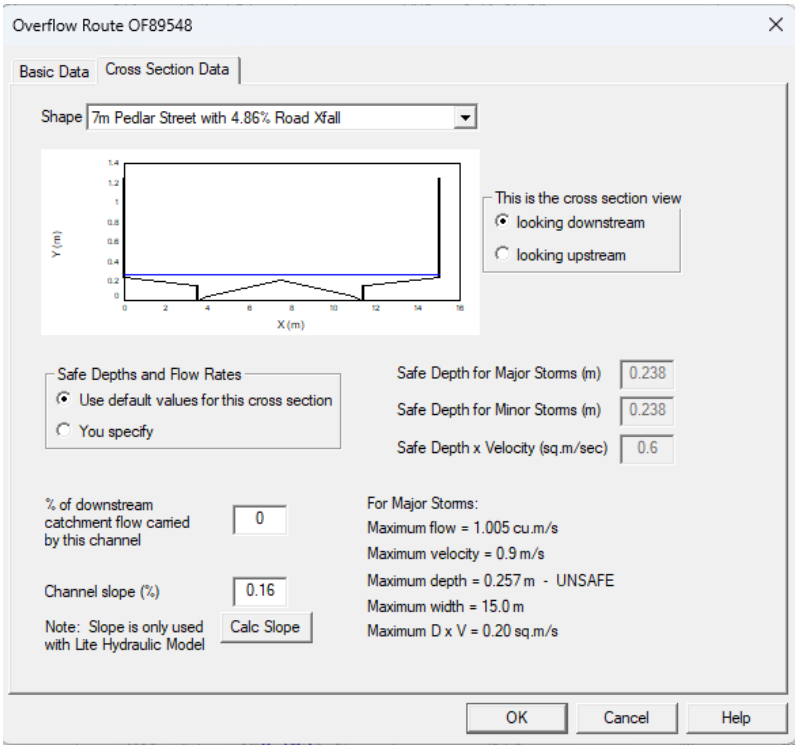


Figure 5-5 Critical Overland flow profile along Pedlar Street during 1% AEP storm

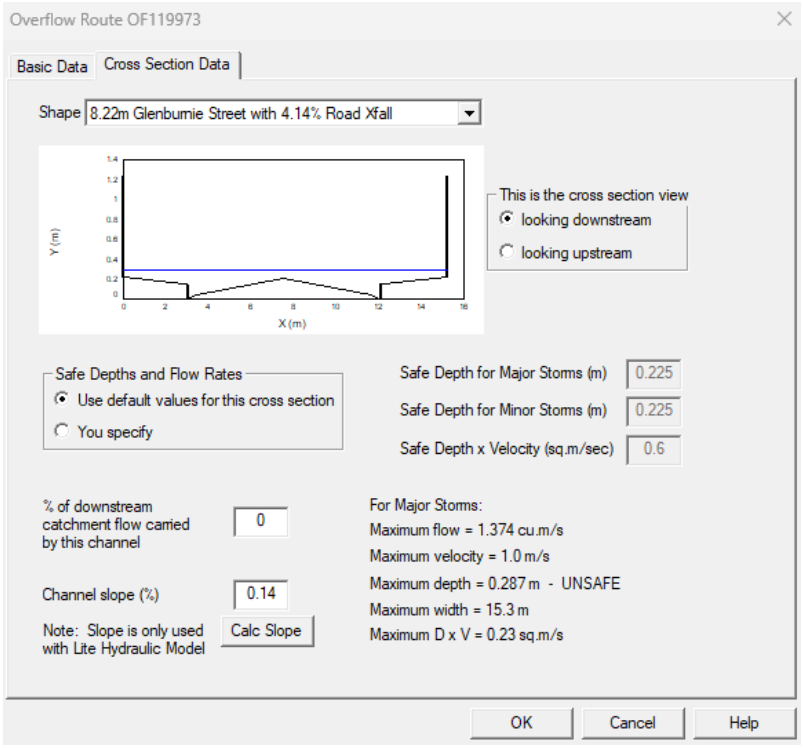


Figure 5-6 Critical Overland flow profile along Glenburnie Street during 1% AEP storm

5.2 POST-DEVELOPMENT

Compared with existing site conditions, the proposed land division concept plan shows new additions of high-density dwellings and new laneways created to cater for these new dwellings. Most of the existing established homes will be demolished to make room for the new high-density dwellings while some existing houses will remain. New reserves are created where the future detention basins are proposed to be located to provide a key function to mitigate increased stormwater runoffs from the development site. Overall, compared with pre-development catchments, the total road reserve area increased 7.66 Ha and the total landscape area also increased 4.76 Ha.

The post development stormwater management strategy includes:

- Incorporate five on-site detention basins near the existing stormwater trunk mains to restrict the post-development discharge under pre-development level during major and minor storm events.
- Diverting as much runoffs to the detention basins as practicable.
- Reutilize the site existing stormwater infrastructure, however, provide new drains for new laneways to allow connection to new roof gutters. Some of the existing drains will be upgraded to improve the drainage capacity where required and extended to manage flow widths.
- Overland flows will be designed to have sufficient capacity, e. g. swales to be designed as per 1% AEP storm event flows, road overflows to be safely contained within road reserve.

The proposed drainage layout plan is attached under Appendix A. Post-development Catchment Plan is attached under Appendix B.

5.2.1 Detention Basin

To achieve the design objective, the post-development discharge during major and minor storm event should not exceed the predevelopment peak discharge flows. With increased impervious area from road and high-density housing, five detention basins are introduced for flood attenuation purpose.

The proposed detention basins are designed to be located near the road reserve – three basins on Glenburnie Street, two basins on Pedlar Street – immediate upstream of the trunk main nearby. Note that as Stage 1 is currently being constructed, the Stage 1 detention basin details cannot be altered (detention volumes, invert levels, basin height etc.). Stage 1 detention basin details are derived from Greenhill's Seaton Stage 1 design drawings.

All basins are designed to detain flows from its upstream catchments, there should not be any basin overflows during minor storm event (0.2EY storm event) as per design objectives in Section 3.2, i.e. no overflows from pit/pipe network during minor storm event. Stage 3 basin is designed to mitigate the upstream flooding of Childs Avenue stormwater main with a non-return valve provided at Stage 3 basin outlet, refer Section 5.2.2 for details.

To demonstrate that the total basin footprint does not take more than 20% of the total open space, as a part of the City of Charles Sturt's planning policy, each basin's footprint was determined assuming a side batter of 1:4 plus another 20% allowance for landscaping around the basin, refer Table 5-5. It is concluded that the percentage of the total basin footprint is 14% of the total open space, which meets the City of Charles Sturt planning requirement.

Table 5-4 Proposed Post-Development Detention Basins

Basin Number	Basin Location	Basin Surface RL (mAHD)	Basin IL (mAHD)	Basin Depth (m)	Basin HGL during 0.2EY storm event (mAHD)	Basin HGL during 1% AEP storm event (mAHD)	Proposed Detention Volume (m^3)
1	Stage 1	2.55	1.40	1.15	1.62	2.59	748
2	Stage 10	3.40	1.98	1.43	3.18	3.55	1,026
3	Stage 4	3.80	2.60	1.2	3.48	3.92	527
4	Stage 3	2.71	1.10	1.61	1.63	2.81	2,058
5	Stage 12a	3	2.10	0.9	2.87	3.27	1,644

**Note:*

1. Stage 1 basin DRAINS input (elevation-area relationship) is derived from Greenhill's SMP, the peak storage volume for Stage 1 basin during 1% AEP storm is 748 m^2.

2. Proposed total combined detention volume for Seaton Redevelopment Project is estimated to be 5,255m^3, excluding Stage 1 basin.

Table 5-5 Open Space and Basin Footprint for Stage 2 to Stage 13

Stage	Detention Basin Volume (m^3)	Basin footprint (m^2)	Open Space (m^2)	% Basin footprint
Stage 2	0	0	3,146	0
Stage 3	2,058	2,520	6,700	38%
Stage 4	527	940	2,299	41%
Stage 5	0	0	1,912	0
Stage 6	0	0	501	0
Stage 7	0	0	2,177	0
Stage 8	0	0	2,424	0
Stage 9	0	0	0	0
Stage 10	1,026	1,410	8,317	17%
Stage 11	0	0	2,206	0
Stage 12a	1,644	2,150	2,150	33%
Stage 12b	0	0	2,978	0
Stage 13	0	0	2,434	0
Total	**5,255**	**7,020**	**49,826**	**14%**

**Note:*

1. Stage 1 is excluded from the table.

2. Basin footprint considers a side batter of 1:4 plus an additional 20% for shaping and landscaping.

5.2.2 DRAINS modelling/Results

Post-development DRAINS modelling, input and output are attached under Appendix C, with peak flows at key locations summarized in Table 5-6.

Table 5-6 Post-development DRAINS model results for major and minor storm event

Discharge Point	Peak Flow (m^3/s) at Point of Discharge	
	Minor Storm Event (0.2EY)	Major Storm Event (1% AEP)
Pedlar Street trunk main pipe flow	1.25	1.65
Pedlar Street trunk main overflow	0	0.001
Glenburnie Street overland flow	0	1.69
Total Discharge	1.25	3.34

Childs Avenue Stormwater Main

In the post-development, this drain will be diverted to Basin 4 in Stage 3, refer proposed drainage layout plan in Appendix A for details. To mitigate the flooding in the upstream of the Childs Avenue stormwater main in the current condition, it is proposed to upgrade this drain with 600x450 RCBC 900x600 RCBC and 750RCP to improve the drainage capacity. To reduce the impact of downstream inundation to the upstream network, a non-return valve is to be provided at Stage 3 basin outlet. This is required to ensure that the storage volume is fully available for the local catchment and protects the Childs Avenue low point for surcharge from external catchments. Without the flood gate it was found that stormwater within the Pedlar Street drain would surcharge into the detention basin, raising the downstream hydraulic grade line and flooding issues within Harris Place and the corner of Childs Avenue.

Council's historical drawing suggests that the existing pipe invert level at the basin tie-in location is approximately 0.876 m AHD. According to Seaton Stage 1 Geotechnical Investigation Report, the ground water level within the project area is expected to be at approximately 0.5 m AHD. It is proposed that bioretention basins are to be incorporated to detention basins, refer Section 6 and considering the required thickness of filter media of bioretention basin is 0.5m, therefore the invert level of Basin 4 should not be lower than 1.1 m AHD, such that the basin and filter media is minimum 100mm above than the ground water level.

Low flows discharging from this basin would be limited by a short length of 225RCP pipe with a field inlet pit provided at 1.70 m AHD, just above the 5-year ARI basin HGL level. This is designed to increase the discharge from the basin during 1% AEP storm so that the ponding in the upstream network can be reduced.

With the new detention basin and upgraded drainage network in place, the post-development 0.2EY storm long section profile in Figure 5-7 suggests that the HGL level throughout this drain has been lowered. The upstream pit (Pit 10) has 230 mm freeboard, there is no overflows from pit/pipe network, making it complaint with Council design requirement and a significant improvement on the existing drainage standard within the local sub catchment.

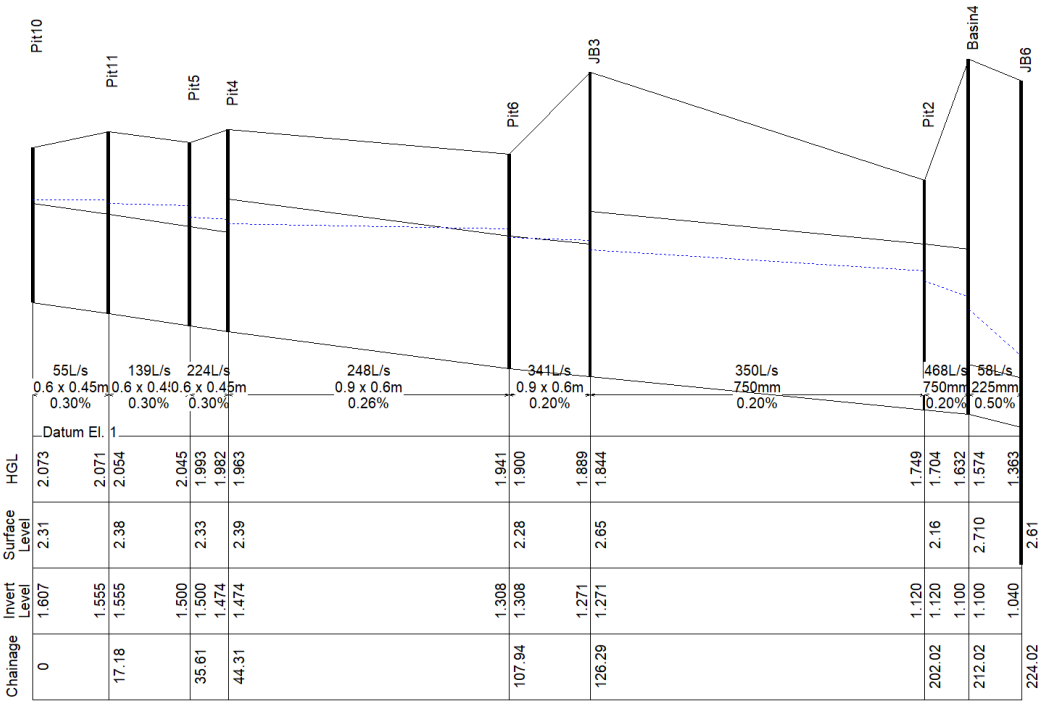


Figure 5-7 Stormwater main under Childs Avenue during post-development 0.2EY storm event (from the upstream cul-de-sac pit 10 to JB6)

Lark Avenue Stormwater Main

In the post-development, it is propose to upgrade the existing 375RCP running along Lark Avenue with 525RCP to increase the capacity of the drainage network as the catchments generate more runoffs compared with predevelopment conditions, and also to address the ponding issue at the sag location near Lark Avenue/Matthew Avenue roundabout, refer discussion in Section 5.1.2, making this location compliant with council requirements, i.e. no overflows during minor storm event.

Post development DRAINS results suggest that there is no overflows in the upstream pit during 0.2EY storm event. There is approximately 36mm freeboard, refer Figure 5-8. DRAINS post development 1% AEP storm results also see a slight decrease of HGL in the upstream pit, approximately 2mm, suggesting an improvement of the flooding condition at the Matthew Avenue/Lark Avenue roundabout during major and minor storm post development.

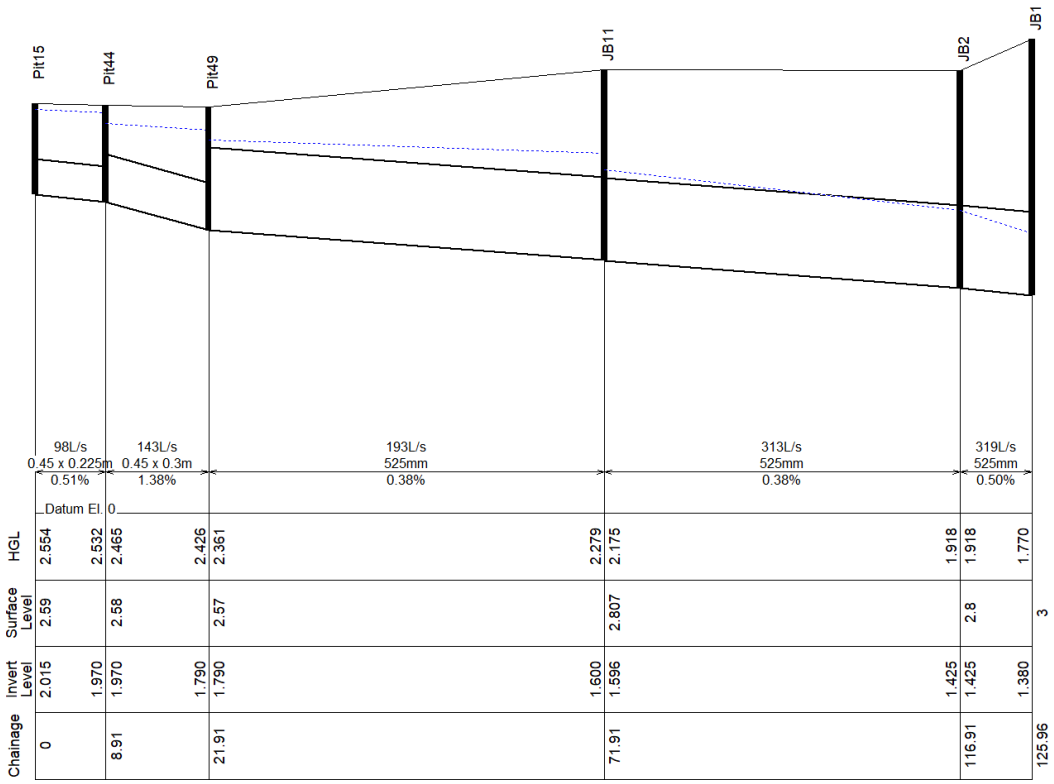


Figure 5-8 Upgraded 525RCP stormwater main under Lark Avenue during 0.2EY storm event (from upstream pit15 to JB1).

Overland flows along Pedlar Street, Glenburnie Street during 1% AEP Storm

Pedlar Street and Glenburnie Street will remain as per status quo post development, therefore there is no change to the road cross section geometry, longitudinal fall etc. Figure 5-9 and Figure 5-10 show the critical road overland profiles for Pedlar Street and Glenburnie Street during 1% AEP storm event within the post development scenario. It is concluded that the overland flows are largely contained within the road reserve and are consistent with the predevelopment scenario.

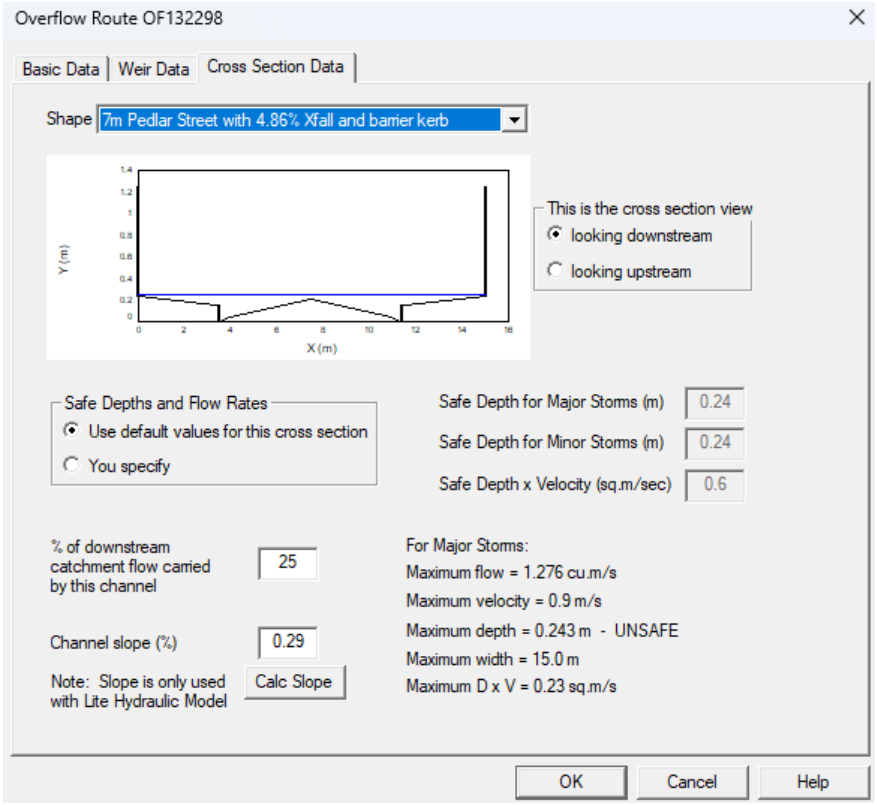


Figure 5-9 Critical Overland flow profile along Pedlar Street during 1% AEP storm

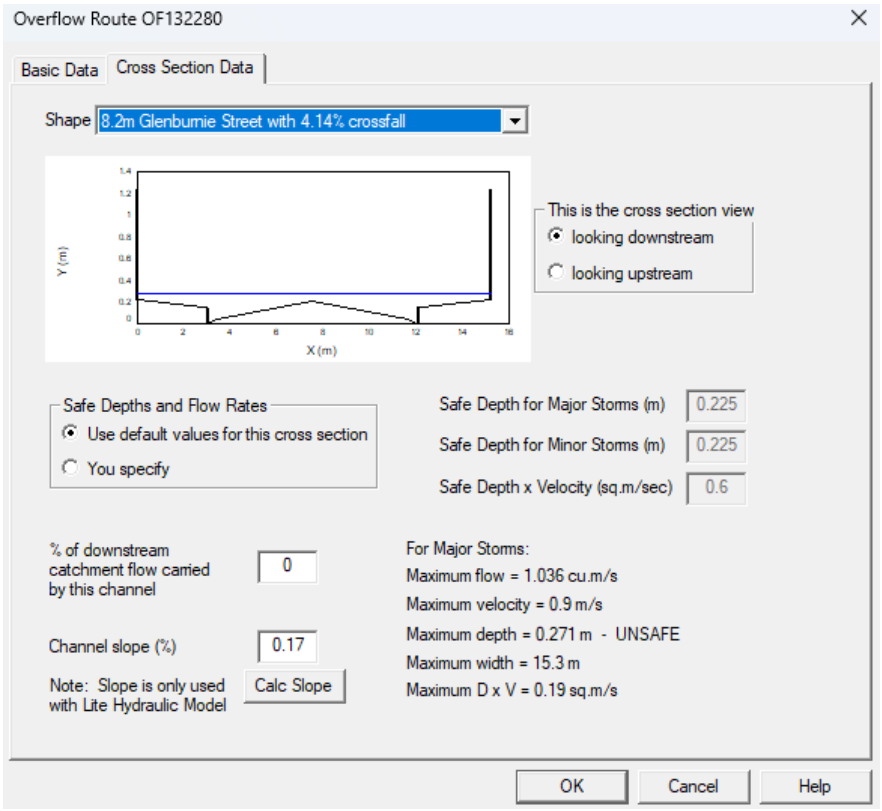


Figure 5-10 Critical Overland flow profile along Glenburnie Street during 1% AEP storm

5.3 DISCUSSION

Refer Table 5-7 for comparison of predevelopment and post development peak flow rate during major and minor storm event. The post-development discharges, including pipe flow, overland flows, are all reduced post development compared with its pre-development levels, in both major and minor storm event. This justifies that overall, the design objectives to maintain predevelopment flows are achieved.

Table 5-7 Comparison of Predevelopment and Post-development discharge

Discharge Point	Minor 1 in 5-year Storm Discharge (m^3/s)		Major 1 in 100-year Storm Discharge (m^3/s)	
Conditions	Pre-development	Post-development	Pre-development	Post-development
Pedlar Street trunk main pipe flow	1.24	1.25	1.69	1.65
Pedlar Street trunk main overflow	0	0	0.088	0.001
Glenburnie Street overland flow	0.01	0	2.14	1.69
Total Discharge	1.25	1.25	3.92	3.34

Table 5-8 shows the comparison of ponding Revert Level (RL) at three key locations which are prone to flooding under existing conditions, before and after development. Long Section Profiles shown in Figure 5-7 and Figure 5-8 shows there is no overflows from Council drainage network during minor (0.2 EY) storm event in post development conditions, if the proposed upgrades in Section 5.2 are taken.

Overall, the ponding depths at three locations are either maintained as per existing or improved post development.

Table 5-8 Ponding RL (mAHD) and ponding depth (m) for pits located in areas prone to flood

Pit Name in DRAINS	Pit 2		Pit 10		Pit 44	
Location	At western end of Harris Place		Cul-de-sac on Lark Avenue		At Lark Ave/Matthew Ave Roundabout	
Existing Surface RL (mAHD)	2.16		2.31		2.59	
Condition	Pre-development	Post-development	Pre-development	Post-development	Pre-development	Post-development
Ponding RL during minor storm (mAHD)	2.38	2.38	2.58	2.44	2.70	2.69
Ponding depth at minor storm (mm)	220	220	270	125	120	110

Pit Name in DRAINS	Pit 2		Pit 10		Pit 44	
Ponding RL during major storm (mAHD)	2.82	2.82	2.82	2.82	2.81	2.81
Ponding depth at major storm (mm)	660	660	510	510	230	230

Table 5-9 shows the critical flood depths along Pedlar Street and Glenburnie Street during major storm event before and after development. DRAINS results indicate that overland flows are slightly reduced in the post development scenario and largely contained within road reserve, refer results from Section 5.1.1 and Section 5.2.2.

Table 5-9 Critical Flood depth at road reserve during 1% AEP storm event before and after development

Road Name	Pre-development Flood depth (mm)	Post-development Flood depth (mm)
Pedlar Street	257	243
Glenburnie Street	287	271

6 Stormwater Quality

6.1 MUSIC MODELLING AND RESULTS

To achieve the water quality design objectives outlined in Section 3.2.2, It is proposed that the water quality treatment train includes the following:

- Rainwater Tanks
  - Plan SA suggests that for new development in Seaton, new dwellings with site area less than 400 m^2 need to incorporate minimum 2000 kL retention/detention combined tank (1000 kL detention, 1000 kL retention as a minimum). However, the detention portion does not provide any water quality treatment benefits, stormwater quantity is managed on a development scale for this project as per this stormwater management plan and a 2kL rainwater tank is significant for an average of 200 m^2 allotment. Therefore, it is proposed to incorporate a 1kL rainwater tank (retention tank) for each allotment only as this is a key contribution to water quality within the treatment train.
  - The number of rainwater tanks is dependent on the number of allotment within each catchment. Based on *Water Sensitive SA South Australian MUSIC Guideline Table 8.1*, the estimated daily water reuse demand per person is 28L/day, assuming two people per household, the water reuse daily demand will become 56L/day per rainwater tank.
- Gross Pollutant Traps (Generic GPT)
  - GPTs are designed to be installed within all the pits upstream of the detention basin so that pollutants such as gross pollutants and suspended solids are captured prior to discharge into the basin. They are generally not effective to remove phosphorus or nitrogen. A generic GPT node has been included in modelling with a performance of 98% removal of Gross Pollutants and 61% removal of suspended solids. They are also placed in the downstream pits of raingarden or swale to achieve the pollutant removal targets.
- Detention Basin
  - Details of the detention basin is pre-determined by DRAINS, refer Section 5.2.1 for detention volume for each basin.
- Bioretention systems/rain gardens
  - Bioretention systems are designed to capture stormwater runoff in a shallow depression filled with specially engineered soil and vegetation, allowing the water to slowly percolate through the soil, filtering out pollutants, especially nitrogen and phosphorous.
  - Road reserves provide limited space for stormwater treatment, as the area is generally small, only adequate for raingardens. The project proposes to incorporate these into the streetscapes wherever possible and opportune, however considering the large quantities of stormwater runoff need to be treated, larger extents of bioretention will be required. The bioretention systems are proposed to be incorporated with detention basin, achieving stormwater attenuation and water quality control as a whole.
  - In some stages of the development where there is no direct connection to a stormwater detention basin, linear bioretention swales or raingardens in road verge are proposed to be incorporated into the open space.
  - To maximise the detention volume for minimum footprint area, detention basin inverts will be set as deep as possible given existing downstream pipe invert levels. This will mean that it

is not possible to install sub-surface drainage at the bottom of the filter media and connect to a gravity stormwater network. It is therefore proposed that the filter media will not be lined with an impermeable liner and will therefore drain via infiltration to the subgrade only.

- As the basins are not to be lined, allowing for underground exfiltration. According to *West Lakes Catchment Stormwater Management Plan 2022*, the site's soil type is red brown sandy clay. For the purpose of modelling, the exfiltration rate is assumed to be 20mm/h for sandy clay.
- The typical bioretention input in Seaton MUSIC model is shown in Figure 6-1. Note that surface area, filter area and unlined filter media perimeter varies, refer Table 6-1 for details of each bioretention system/raingardens.

- Swales
  - For the development in which swales are present, a 50 m swale with assumed cross section geometry (top width 5m, base width 1m, depth 0.5m, vegetation height 0.25m) was set up in MUSIC. The exfiltration rate is assumed to be 20mm/h for sandy clay.

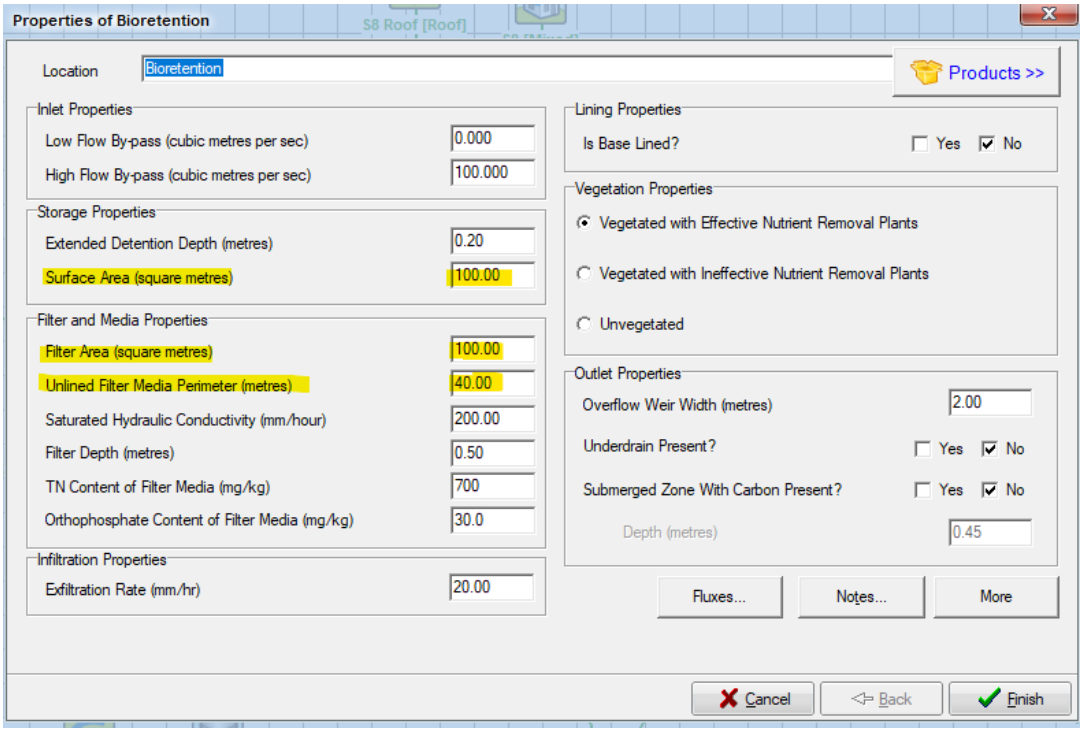


Figure 6-1 Typical Input for Bioretention system (filter area, surface area, and unlined filter media perimeter varies)

Table 6-1 Bioretention details

Bioretention System	Location	Detention Basin Surface Area (m^2)	Biorenteion Surface Area (m^2)
Stage 10 Bioretention	Stage 10 detention basin	650	150
Stage 4 Bioretention	Stage 4 detention basin	400	70
Stage 3 Bioretention	Stage 3 detention basin	900	200
Stage 12a Bioretention	Stage 12a detention basin	1400	350
Stage 8 raingarden	Street verge/landscape area	n.a	70

The Seaton MUSIC water quality treatment train is set up as shown in Figure 6-1.

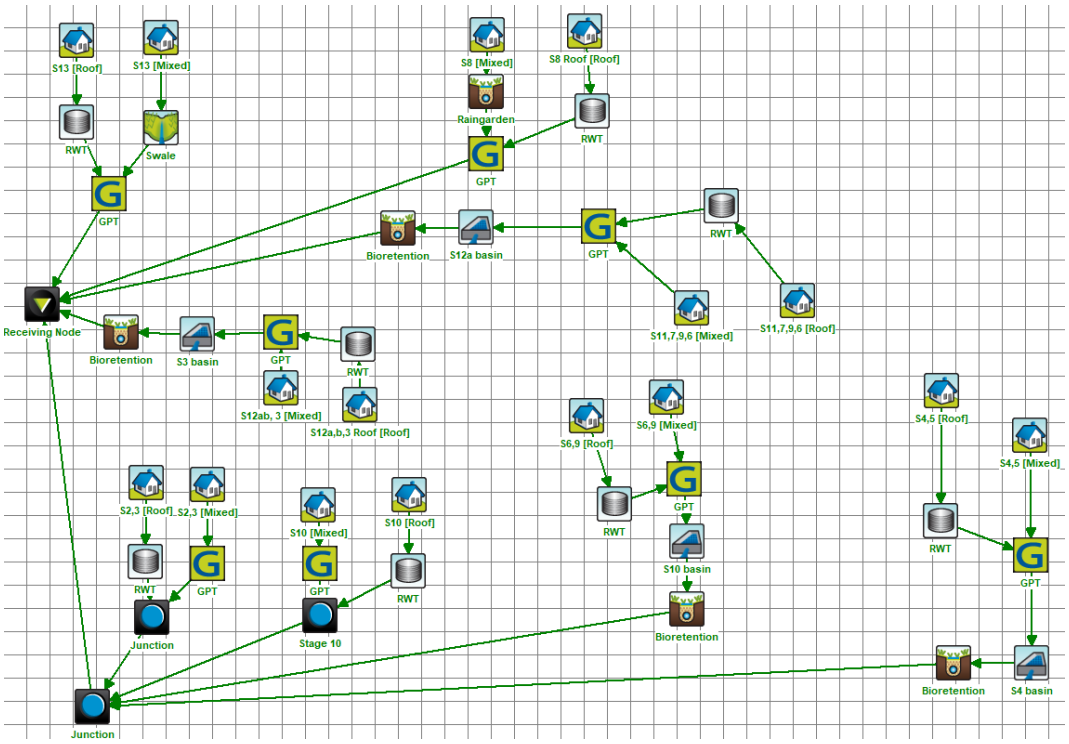


Figure 6-2 Seaton Urban Renewal MUSIC file

The MUSIC modelling results for the redevelopment to the receiving node with the treatment train outlined above is summarised in the table below. It can be concluded that the proposed treatment train has achieved the pollutants removal targets.

Table 6-2 MUSIC Results Summary

Pollutant	Design Objective (% reduction)	MUSIC results (% reduction)
Gross Pollutants	90%	99.9%
Total Suspended Solids	80%	81.4%
Total Phosphorus	60%	60.5%
Total Nitrogen	45%	55.3%

7 Conclusion

7.1 SUMMARY

The Seaton Urban Renewal project consists of up to 13 stages of development over the existing established community. This stormwater management report examines the stormwater management of the existing site and proposes stormwater strategies for the proposed development to collect, convey, detain and ultimately discharge the stormwater for the development site, such that all City of Charls Sturt and other regulatory requirements are met.

The overall proposed stormwater drainage strategy for the Seaton Urban Renewal Project is summarised in Appendix A and this stormwater management repot has concluded the following:

- Five detention basins are proposed, located next to the existing Council stormwater main. Except Stage 1 basin which is currently being constructed on site, hydraulic modelling was conducted using DRAINS to determine the detention volume for the other four detention basins so that there is no basin overflows during Council minor storm event, and that the post development discharge is no greater than its predevelopment discharge during both major and minor storm events. The combined total detention volume for the four basins is estimated to be 5,255 m^3.
- In the pre-development condition, it was found that ponding occurs during minor storm event at the upstream of the Childs Avenue and Lark Avenue drainage networks, which are currently non-compliant with Council requirement. It is proposed that Stage 3 basin will include a non-return valve at the basin outlet, so that the upstream catchment can be further detained by this basin. Both Childs Avenue drain and Lark Avenue drain require to be upgraded to prevent surcharge at the low point in the upstream during 5% AEPs storm event, making these locations compliant with council requirements post development.
- DRAINS results show that the post development discharge is lower than its predevelopment discharge in both major and minor storm. It is concluded that the design has achieved the design objectives set in Section 3.2.
- Water quality modelling was carried out using MUSIC. The water quality treatment train consists of detention tanks, bioretention systems within detention basins, GPT, and rainwater tanks. Results demonstrate that the proposed water quality treatment train has met the Council's pollutant removal targets.

7.2 OUTSTANDING ITEMS AND FURTHER WORK

This report proposes an overall drainage strategy for the Seaton Urban Renewal project. It is anticipated that:

- Council review and endorsement of this Stormwater Management Plan as an agreed overall strategy for drainage for the project.
- Concept designs for the integration of the stormwater detention and bioretention basins and integrate with urban design, landscape to achieve Council open space objectives.
- Detailed design on a stage-by-stage basis. An indicative and estimated pit and pipe upgrade layout is shown in Proposed drainage layout plan attached under Appendix A, detailed calculations will be carried out to confirm pipe sizes and pit inlet locations to meet detailed flow width and inlet capacity requirements.
- Detailed design of detention basins (including landscape design) as part of the staged development of the project.

8 References

- Argue, 1986, Stormwater Drainage Design in Small Urban Catchments: A handbook for Australian Practice, Australian Road Research Board, SR34.
- Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors), 2019, Australian Rainfall and Runoff: A Guide to Flood Estimation, Commonwealth of Australia
- City of Charles Sturt, City of Charles Sturt Floodplain Mapping https://www.charlessturt.sa.gov.au/development-and-infrastructure/infrastructure/floodplain-mapping
- Elvis Elevation Foundation Spatial Data https://elevation.fsdf.org.au/
- Environmental Assessment – West Lakes Assessment Stage 1, Environmental Protection Agency, July 2021 https://engage.epa.sa.gov.au/60388/widgets/308753/documents/211470#:~:text=the%20Assessment%20Area.-,%E2%96%AA,%E2%96%AA
- South Australia MUSIC Guideline, February 2021
- SA-MUSIC-Guidelines-15Feb21-FINAL-DRAFT-for-website-22Mar21.pdf
- Tonkin, 2022, West Lakes Catchment Stormwater Management Plan https://hdp-au-prod-app-ccs-yoursay-files.s3.ap-southeast-2.amazonaws.com/1616/4492/6499/West_Lakes_Catchment_SMP_-_Consultation_Report.pdf
- Tonkin, 2018, Western Adelaide Region Climate Change Adaption Plan https://www.cityofpae.sa.gov.au/__data/assets/pdf_file/0019/541126/Item-12.3.1-Att-1-Coastal-and-Inundation-Modelling-Phase-3-Report.pdf

Appendix A: Proposed Drainage Layout Plan

LEGEND

- SWALE
- NEW SEP
- EXISTING SEP
- FLOW ARROW
- EXISTING DRAIN
- DESIGN DRAIN
- BASIN
- PIPE TO BE DISCONNECTED
- JUNCTION BOX

- HIGH POINT x HP
- LOW POINT x LP
- BIO RETENTION
- GPT

NOTE:
1. THIS SKETCH IS NOT A DETAILED DESIGN DRAWING, IT IS A CONCEPT STORMWATER LAYOUT PLAN TO SUPPORT THE MASTER DESIGN. SIZE AND LOCATION OF THE DESIGN DRAIN ARE SHOWN INDICATIVELY AND ARE SUBJECT TO CHANGE AS DETAILED DESIGN PROGRESSES.
2. STAGE 1 IS CURRENTLY UNDER CONSTRUCTION, STORMWATER LAYOUT FOR STAGE 1 IS ABSTRACTED FROM GREENHILL'S DESIGN DRAWING. PLEASE REFER GREENHILL'S CONSTRUCTION DRAWING FOR STAGE 1 FULL STORMWATER LAYOUT.
3. PROVIDE GROSS POLLUTANT TRAP (GPT) IN ALL PITS IMMEDIATE UPSTREAM DISCHARGING TO THE DETENTION BASIN.

WEST LAKES BOULEVARD
PEDLAR RESERVE
FIDDOCK ST
PEDLAR STREET
MATTHEWS AVE
GLENBURNIE STREET
FREDERICK ROAD
TAPLEYS HILL ROAD
GREEN AVENUE
SEATON HIGH SCHOOL
RETAIL CENTRE
BUS STOP

PROVIDE 70m2 BIORETENTION
PROVIDE 350 m2 BIORETENTION
PROVIDE 200 m2 BIORETENTION
PROVIDE A NON-RETURN VALVE.
PROVIDE 150 m2 BIORETENTION
PROVIDE 70 m2 BIORETENTION
UPGRADE EXISTING DRAINAGE PIPES
UPGRADE EXISTING DRAINAGE PIPES
OPPORTUNITIES TO MAKE THE BASIN IN A LINEAR FORM AND RUN A DESIGN PIPE DISCHARGING TO THE BASIN.
RETAIN EXISTING DRAIN TO SERVICE STAGE 4,5 &6 UNTIL STAGE 9 &10 ARE COMPLETE.
UPSTREAM DRAINAGE NETWORK ALONG TAPLEYS HILL ROAD NOT SHOWN FOR CLARITY.
UPSTREAM DRAINAGE NETWORK ALONG TAPLEYS HILL ROAD NOT SHOWN FOR CLARITY.
REFER NOTE 2
BASIN1 748m3

IL = 0.87
IL = 1.05
IL = 1.34
IL = 1.56
IL = 1.86
0.09%
0.13%
0.11%

1.2x0.75 RCBC
1.35x0.675 RCBC
2x600RCP/ 1x750RCP
825RCP
450RCP
375 RCP
300RCP
900 RCP

1
2
3
4

SCALE 1: 1000 SCALE IN m 0 20 40 60 80

SEATON URBAN RENEWAL
PRPOSED DRAINAGE LAYOUT PLAN
DRAWING SCALE 1:1000
PAPER SIZE A0

Appendix B: Catchment Plan

LEGEND

EXISTING DRAIN — DRAIN

FLOW ARROW

POINT OF DISCHARGE

EXTERNAL CATCHMENT 1
3.3 ha
Imp. 65.39%
Perv. 21.63%

EXTERNAL CATCHMENT 2
14.13 ha
Imp. 65.78%
Perv. 21.39%

EXTERNAL CATCHMENT 3
35.03 ha
Imp. 66.12%
Perv. 21.39%

EXTERNAL CATCHMENT 4
4.23 ha
Imp. 60%
Perv. 25%

CATCHMENT 1a
CATCHMENT 1b
CATCHMENT 6a
CATCHMENT 3
CATCHMENT 11
CATCHMENT 12
CATCHMENT 13
CATCHEMNT 1
CATCHEMNT 2
CATCHEMNT 3
CATCHEMNT 4
CATCHEMNT 5
CATCHEMNT 6
CATCHEMNT 7
CATCHEMNT 7a
CATCHEMNT 8
CATCHEMNT 9
CATCHEMNT 10
CATCHEMNT 11
CATCHEMNT 14
CATCHEMNT 15
CATCHEMNT 16
CATCHEMNT 17
CATCHEMNT 18

45,294.35 sq m
33,117.02 sq m
9,383 sq m
14,476.77 sq m
1,357.13 sq m
19,507.25 sq m
1,979.13 sq m
6,653.92 sq m
16,005.15 sq m
31,079.71 sq m
1,288.59 sq m
69,351.16 sq m
59,043.86 sq m
141,477.5 sq m
350,389.3 sq m

PEDLAR STREET
FREDERICK ROAD
TAPLEYS HILL ROAD
GLENBURNIE STREET

SCALE 1:2000 — 0 40 80 120 160 SCALE IN m

SEATON URBAN RENEWAL
PRE-DEVELOPMENT CATCHMENT PLAN

DRAWING SCALE 1:2000
PAPER SIZE A0

LEGEND

- SWALE
- SEP
- FLOW ARROW
- EXISTING DRAIN — DRAIN —
- DESIGN DRAIN — DRAIN —
- BASIN
- POINT OF DISCHARGE

NOTE:
EXTERNAL CATCHMENTS TO REMAIN POST DEVELOPMENT. PLEASE REFER PRE-DEVELOPMENT CATCHMENT FOR EXTERNAL CATCHMENT.

WEST LAKES BOULEVARD
BUS STOP
PEDLAR STREET
FIDDOCK ST
TAPLEYS HILL ROAD
FREDERICK ROAD
MATTHEWS AVE
GLENBURNIE STREET
SEATON HIGH SCHOOL
RETAIL CENTRE
GREEN AVENUE

CATCHEMNT 1 — 25,844.13 sq m
CATCHEMNT 2 — 23,033.01 sq m
CATCHEMNT 2a — 28,848.99 sq m
CATCHEMNT 4 — 6,941.31 sq m
CATCHEMNT 5 — 8,483.63 sq m
CATCHEMNT 7 — 8,972.82 sq m
CATCHEMNT 6 — 11,827.03 sq m
CATCHEMNT 3 — 1,344.84 sq m
CATCHEMNT 7a — 6,515.92 sq m
CATCHEMNT 8 — 3,797.95 sq m; 3,709.71 sq m
CATCHEMNT 9 — 12,470.13 sq m
CATCHEMNT 14
CATCHEMNT 9 — 11,885.14 sq m
CATCHEMNT 10a
CATCHEMNT 10b — 3,883.24 sq m
CATCHEMNT 10
CATCHEMNT 15
CATCHEMNT 11a
CATCHEMNT 11b — 7,075.87 sq m
CATCHEMNT 11e — 3,215.38 sq m
CATCHEMNT 11d
CATCHEMNT 12
CATCHEMNT 12a
CATCHEMNT 13 — 8,988.72 sq m
CATCHEMNT 16
CATCHEMNT 17 — 71,221.7 sq m
CATCHEMNT 18 — 65,301.77 sq m
CATCHEMNT 18a — 31,969.31 sq m
CATCHMENT 6a
CATCHMENT 13a

SCALE 1: 1000 — SCALE IN m

SEATON URBAN RENEWAL
POST-DEVELOPMENT CATCHMENT PLAN

DRAWING SCALE 1:1000
PAPER SIZE A0

Pre-development Catchment Properties

Private Dwellings	Proportion
Roof Area	60.00%
Shed/ paving area	15.00%
Grassed Area	25.00%

SAHA Dwellings	Proportion
Roof Area	20.00%
Shed/ paving area	5.00%
Grassed Area	75.00%

						Catchment Characteristics for Private Owned Properties				Catchment Characteristics for SAHA Dwellings				DRAINS INPUT CATCHMENT DATA			
	Total (m2)	Total (Ha)	Road	Grassed	Residental Allotment area	Private Homes	Residential Roof area.(60%)	Residential Shed/pav area.(15%)	Residential Perv. (25%)	SAHT Allotment Area	Residential Roof area.(20%)	Residential Shed/pav area.(5%)	Residential Perv. (75%)	%EIA	%RIA	% PA	Total Perv.
Catchment 1	14638.00	1.464	1201.60	0	13436.40	3257.4	1954.44	488.61	814.35	10179.00	2035.80	508.95	7634.25	35.47%	6.81%	57.72%	8448.60
Catchment 1a	5919.00	0.592	0.00	0	5919.00	2075.86	1245.52	311.38	518.97	3843.14	768.63	192.16	2882.35	34.03%	8.51%	57.46%	3401.32
Catchment 1b	360.00	0.036	360.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00%	0.00%	0.00%	0.00
Catchment 2	44806.00	4.481	4792.00	20229.929	19784.07	0.00	0.00	0.00	0.00	19784.07	3956.81	989.20	14838.05	19.53%	2.21%	78.27%	35067.98
Catchment 3	12946.00	1.295	682.22	0	12263.79	2179.98	1307.99	327.00	544.99	10083.81	2016.76	504.19	7562.86	30.95%	6.42%	62.63%	8107.85
Catchment 4	5920.00	0.592	670.00	0	5250.00	1410.38	846.23	211.56	352.60	3839.62	767.92	191.98	2879.71	38.58%	6.82%	54.60%	3232.31
Catchment 5	9817.00	0.982	819.00	0	8998.00	683.54	410.12	102.53	170.89	8314.46	1662.89	415.72	6235.85	29.46%	5.28%	65.26%	6406.73
Catchment 6	12100.00	1.210	1223.44	0	10876.56	4291.64	2574.98	643.75	1072.91	6584.93	1316.99	329.25	4938.69	42.28%	8.04%	49.68%	6011.60
Catchment 6a	1343.00	0.134	356.29	0	986.71	986.71	592.03	148.01	246.68	0.00	0.00	0.00	0.00	70.61%	11.02%	18.37%	246.68
Catchment 7	5055.00	0.506	422.13	0	4632.87	1794.23	1076.54	269.13	448.56	2838.65	567.73	141.93	2128.98	40.88%	8.13%	50.99%	2577.54
Catchment 7a	14472.00	1.447	2145.73	0	12326.27	2032.93	1219.76	304.94	508.23	10293.34	2058.67	514.67	7720.01	37.48%	5.66%	56.86%	8228.24
Catchment 8	4606.43	0.461	557.00	0	4049.43	569.32	341.59	85.40	142.33	3480.11	696.02	174.01	2610.08	34.62%	5.63%	59.75%	2752.41
Catchment 9	13128.64	1.313	1125.79	0	12002.85	9247.04	5548.23	1387.06	2311.76	2755.80	551.16	137.79	2066.85	55.03%	11.61%	33.35%	4378.61
Catchment 10	6046.19	0.605	1017.00	0	5029.19	2485.00	1491.00	372.75	621.25	2544.19	508.84	127.21	1908.14	49.90%	8.27%	41.83%	2529.39
Catchment 11	37323.79	3.732	4407.97	0	32915.82	0.00	0.00	0.00	0.00	32915.82	6583.16	1645.79	24686.87	29.45%	4.41%	66.14%	24686.87
Catchment 12	2636.80	0.264	477.77	0	2159.03	0.00	0.00	0.00	0.00	2159.03	431.81	107.95	1619.27	34.50%	4.09%	61.41%	1619.27
Catchment 13	2808.73	0.281	407.94	0	2400.79	934.57	560.74	140.19	233.64	1466.22	293.24	73.31	1099.66	44.93%	7.60%	47.47%	1333.31
Catchment 14	7136.23	0.714	776.78	0	6359.46	2102.57	1261.54	315.38	525.64	4256.89	851.38	212.84	3192.67	40.49%	7.40%	52.10%	3718.31
Catchment 15	16332.16	1.633	1451.60	0	14880.56	1755.40	1053.24	263.31	438.85	13125.16	2625.03	656.26	9843.87	31.41%	5.63%	62.96%	10282.72
Catchment 16	31537.89	3.154	4769.42	0	26768.47	6740.50	4044.30	1011.08	1685.13	20027.97	4005.59	1001.40	15020.98	40.65%	6.38%	52.97%	16706.10
Catchment 17	70547.50	7.055	7626.50	0	62921.00	12862.90	7717.74	1929.43	3215.72	50058.11	10011.62	2502.91	37543.58	35.94%	6.28%	57.78%	40759.30
Catchment 18	69124.12	6.912	8898.54	0	60225.58	14752.84	8851.70	2212.93	3688.21	45472.74	9094.55	2273.64	34104.55	38.84%	6.49%	54.67%	37792.76
External Catchment 1	33011.00	3.301	4451.06	0	28559.94	28559.94	17135.96	4283.99	7139.98					65.39%	12.98%	21.63%	7139.98
External Catchment 2	141339.60	14.134	20417.33	0	120922.27	120922.27	72553.36	18138.34	30230.57					65.78%	12.83%	21.39%	30230.57
External Catchment 3	350327.73	35.033	50636.60	0	299691.13	299691.13	179814.68	44953.67	74922.78					65.78%	12.83%	21.39%	74922.78
External Catchment 4	42330.31	4.233	0.00	0	42330.31	42330.31	25398.19	6349.55	10582.58					60.00%	15.00%	25.00%	10582.58

Post-development Catchment Properties

Existing Dwelling	Proportion
Roof Area	60.00%
Shed/ paving area	15.00%
Grassed Area	25.00%

New Dwelling	Proportion
Roof Area	80.00%
Shed/paving area	10.00%
Grassed Area	10.00%

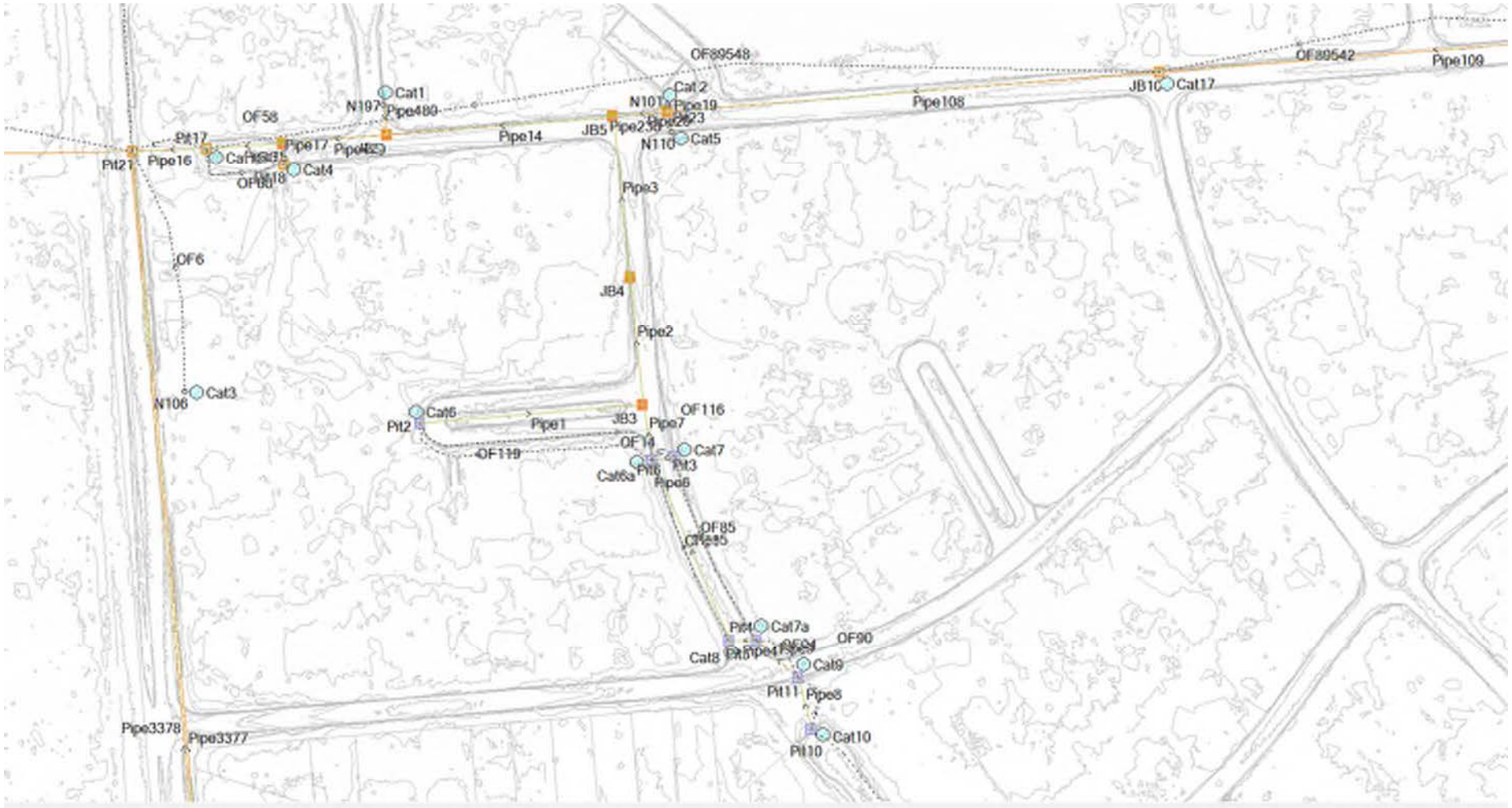
New Apartment	Proportion
Roof Area	100%

					Existing Housing				New Housing				New Apartment	DRAINS INPUT CATCHMENT DATA		
	Total (m2)	Total (Ha)	Road	Grassed	Residental allotment area	Residential Roof area.(60%)	Residential Shed/pav area.(15%)	Residential Perv. (25%)	Residental allotment area	Residential Roof area.(80%)	Residential Shed/pav area.(10%)	Residential Perv. (10%)	Roof area (100%)	%EIA	%RIA	% PA
Catchment 1	24836.19	2.484	2770.00	3363.60	9311.99	5587.19	1396.80	2328.00	8298.40	6638.72	829.84	829.84	1092.2	64.78%	8.97%	26.26%
Catchment 2	23145.87	2.315	1374.06	21771.81	0.00	0	0	0	0	0	0	0	0	5.94%	0.00%	94.06%
Catchment 2a	28715.76	2.872	8742.32	3846.81	0.00	0	0	0	14045.30	11236.24	1404.53	1404.53	2081	76.82%	4.89%	18.29%
Catchment 3	8377.00	0.838	1269.15	1249.12	3384.73	2030.84	507.71	846.18	2474.00	1979.20	247.40	247.40	0	63.02%	9.01%	27.97%
Catchment 4	7531.76	0.753	717.84	3630.50	3183.43	1910.06	477.51	795.86	0	0	0	0	0	34.89%	6.34%	58.77%
Catchment 5	9003.29	0.900	3663.66	738.53	0.00	0.00	0.00	0.00	4601.10	3680.88	460.11	460.11	0	81.58%	5.11%	13.31%
Catchment 6	11818.25	1.182	3051.54	1219.97	7546.75	4528.05	1132.01	1886.69	0	0	0	0	0	64.13%	9.58%	26.29%
Catchment 6a	1343.36	0.134	400.55	0.00	942.82	565.69	141.42	235.70	0	0	0	0	0	71.93%	10.53%	17.55%
Catchment 7	9004.31	0.900	2728.63	1867.87	0.00	0.00	0.00	0.00	4407.80	3526.24	440.78	440.78	0	69.47%	4.90%	25.64%
Catchment 7a	6520.62	0.652	1585.46	0.00	3887.66	2332.60	583.15	971.92	1047.50	838.00	104.75	104.75	0	72.94%	10.55%	16.51%
Catchment 8	3799.89	0.380	921.28	294.38	704.33	422.60	105.65	176.08	1879.90	1503.92	187.99	187.99	0	74.94%	7.73%	17.33%
Catchment 9	11909.55	1.191	3572.01	0.00	5698.79	3419.27	854.82	1424.70	2638.75	2111.00	263.88	263.88	0	76.43%	9.39%	14.18%
Catchment 10	5846.18	0.585	1081.21	1730.45	3034.52	1820.71	455.18	758.63	0	0	0	0	0	49.64%	7.79%	42.58%
Catchment 10a	11747.28	1.175	3396.55	861.46	1672.58	1003.55	250.89	418.14	5816.69	4653.35	581.67	581.67	0	77.07%	7.09%	15.84%
Catchment 10b	5293.95	0.529	2258.52	485.57	0	0	0	0	2549.86	2039.88	254.99	254.99	0	81.19%	4.82%	13.99%
Catchment 11a	8260.00	0.826	2689.61	475.65	0	0	0	0	3837.53	3070.02	383.75	383.75	1257.212	84.95%	4.65%	10.40%
Catchment 11b	7761.60	0.776	2230.97	1979.13	0	0.0024	0.0006	0.001	3551.50	2841.20	355.15	355.15	0	65.35%	4.58%	30.07%
Catchment 12	1815.36	0.182	639.32	0	0	0	0	0	1176.04	940.83	117.60	117.60	0	87.04%	6.48%	6.48%
Catchment 12a	1880.00	0.188	559.00	0	0	0	0	0	1321.00	1056.80	132.10	132.10	0	85.95%	7.03%	7.03%
Catchment 11d	5702.81	0.570	2781.34	0	1210.47	726.2802	181.57005	302.61675	1711.00	1368.80	171.10	171.10	0	85.51%	6.18%	8.31%
Catchment 11e	3241.43	0.324	1134.90	0	0	0	0	0	857.57	686.06	85.76	85.76	1248.959	94.71%	2.65%	2.65%
Catchment 13a	554.00	0.055	554.00	0	0	0	0	0	0.00	0.00	0.00	0.00	0	100.00%	0.00%	0.00%
Catchment 13	7413.00	0.741	1510.00	0	0	0	0	0	5903.00	4722.40	590.30	590.30	0	84.07%	7.96%	7.96%
Catchment 14	8049.39	0.805	2961.58	1452.71	1416.00	849.6	212.4	354	2219.10	1775.28	221.91	221.91	0	69.40%	5.40%	25.20%
Catchment 15	5462.60	0.546	2211.60	0	0	0	0	0	3251.00	2600.80	325.10	325.10	0	88.10%	5.95%	5.95%
Catchment 16	8943.00	0.894	4983.62	0	1694.50	1016.7	254.175	423.625	2264.88	1811.90	226.49	226.49	0	87.36%	5.37%	7.27%
Catchment 17	71901.16	7.190	23935.96	8743.20	7222.00	4333.2	1083.3	1805.5	32000.00	25600.00	3200.00	3200.00	0	74.92%	5.96%	19.12%
Catchment 18	65431.23	6.543	23655.45	9922.08	5509.00	3305.4	826.35	1377.25	26344.70	21075.76	2634.47	2634.47	0	73.42%	5.29%	21.30%
Catchment 18a	31960.32	3.196	13426.68	4162.63	552.59	331.5558	82.88895	138.14825	3939.79	3151.83	393.98	393.98	9878.63	83.82%	1.49%	14.69%
External Catchment 1	33011.00	3.301	4451.06	0	28559.94	17135.96	4283.99	7139.98						65.39%	12.98%	21.63%
External Catchment 2	141339.60	14.134	20417.33	0	120922.27	72553.36	18138.34	30230.57						65.78%	12.83%	21.39%
External Catchment 3	350327.73	35.033	50636.60	0	299691.13	179814.68	44953.67	74922.78						65.78%	12.83%	21.39%
External Catchment 4	42330.31	4.233	0.00	0	42330.31	25398.19	6349.55	10582.58						60.00%	15.00%	25.00%

Appendix C: Drains Input and Output

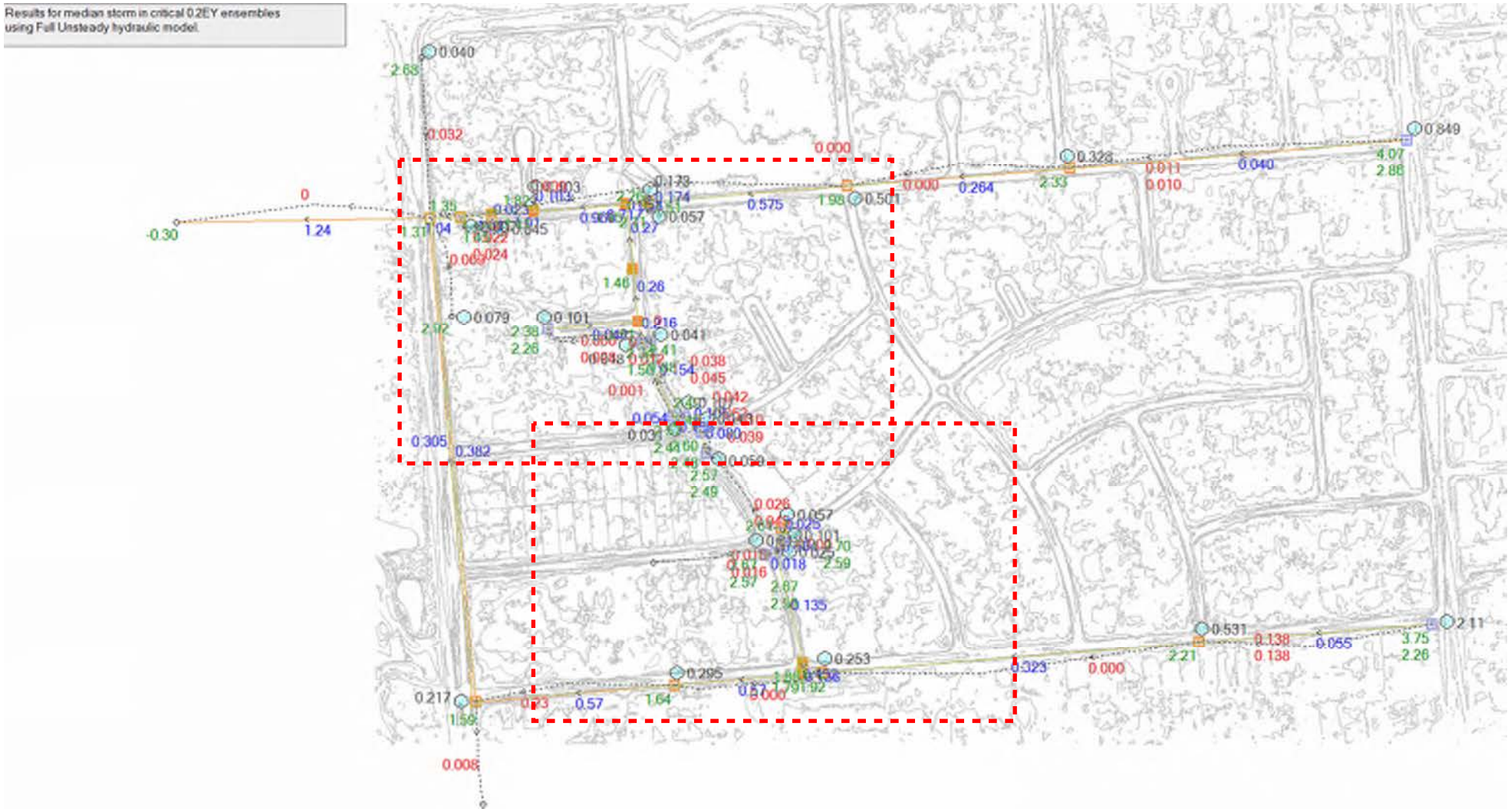
1. PRE-DEVELOPMENT DRAINS MODEL

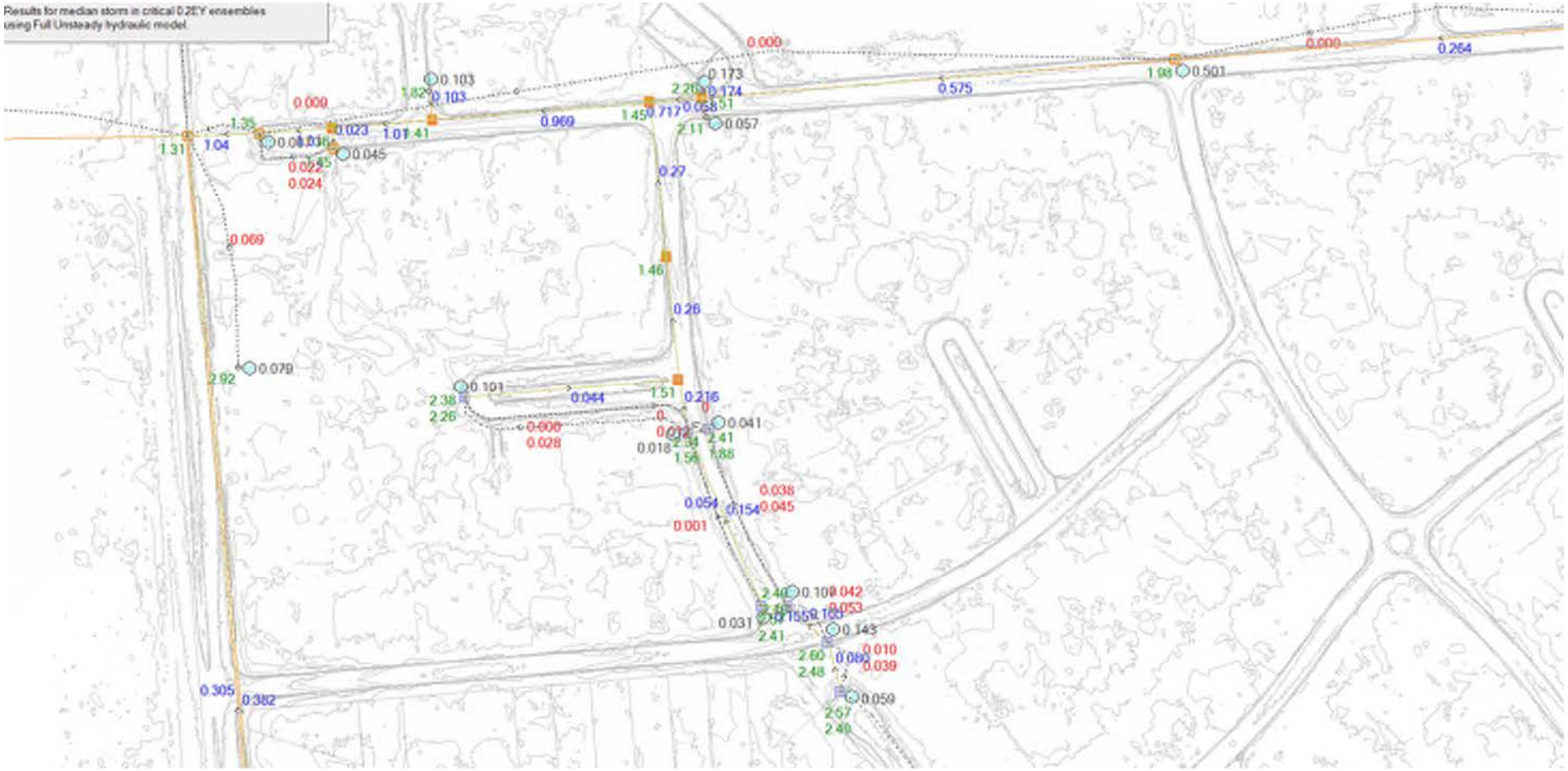


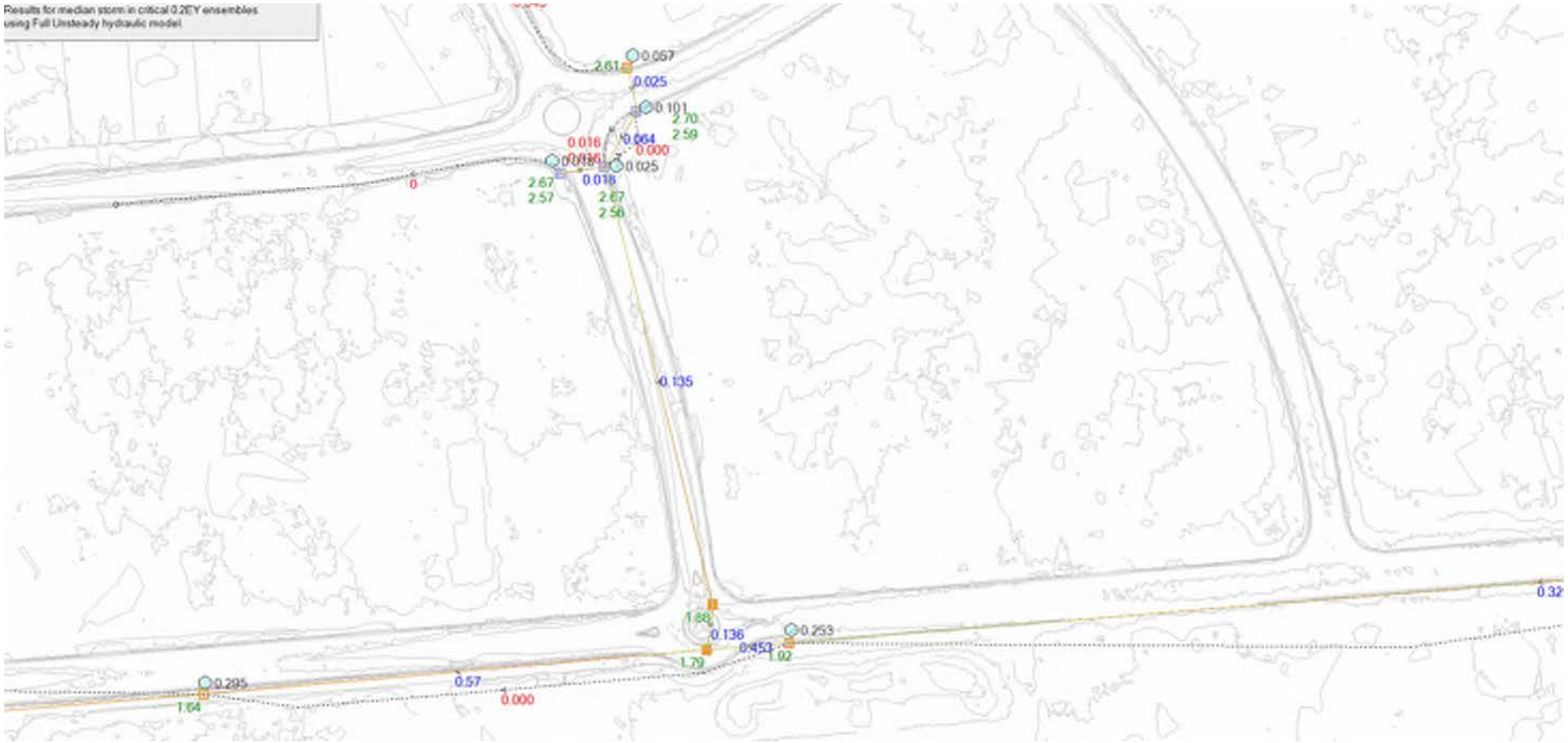

OF89548
OF89542
Pipe109
Cat1
N107
Pipe480
Cat2
N101
Pipe19
Pipe108
JB10
Cat17
OF58
Pipe14
JB5
Pipe23
N110
Cat5
Pipe3
Pipe16
Cat4
OF6
JB4
Pipe2
N106
Cat3
Cat6
Pipe1
JB3
Pipe7
OF116
OF119
OF14
Cat7
Cat6a
Pipe6
OF85
Cat7a
OF90
Cat8
Cat9
Pipe8
Pipe3378
Pipe3377
Cat10


Cat14
Pit15
Pipe10
Cat15
Pit44
OF107
Pipe136
OF42
Cat12
Cat13
OF109
Pit48
Pipe135
Pit49
N125
Pipe137
JB2
Pipe26
Cat16
Pipe178
Pit163
JB1
Ext_Cat4
Pipe138
Pit142
OF134465

1.1 1 IN 5 YEAR ARI STORM DRAINS RESULTS

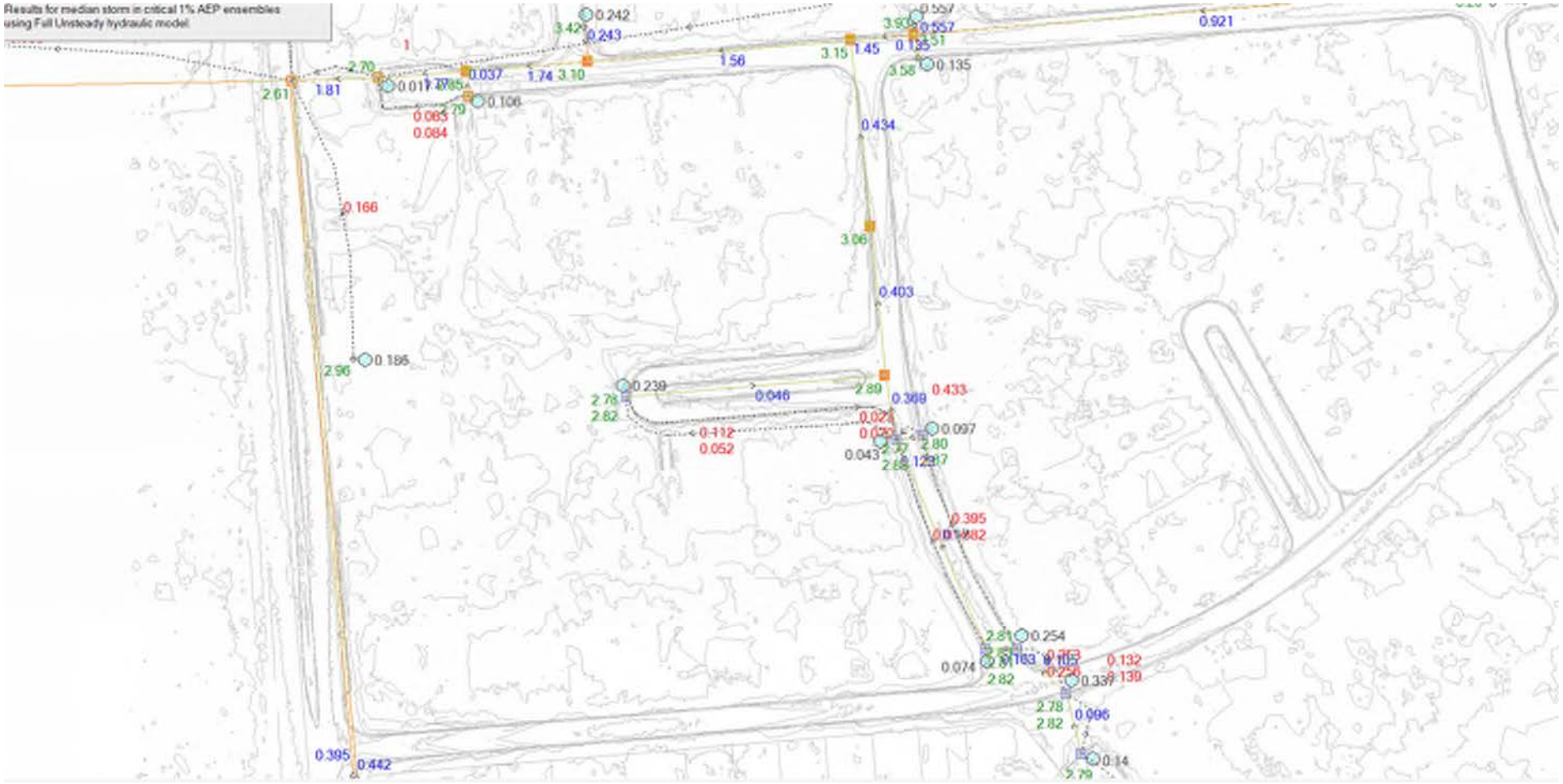


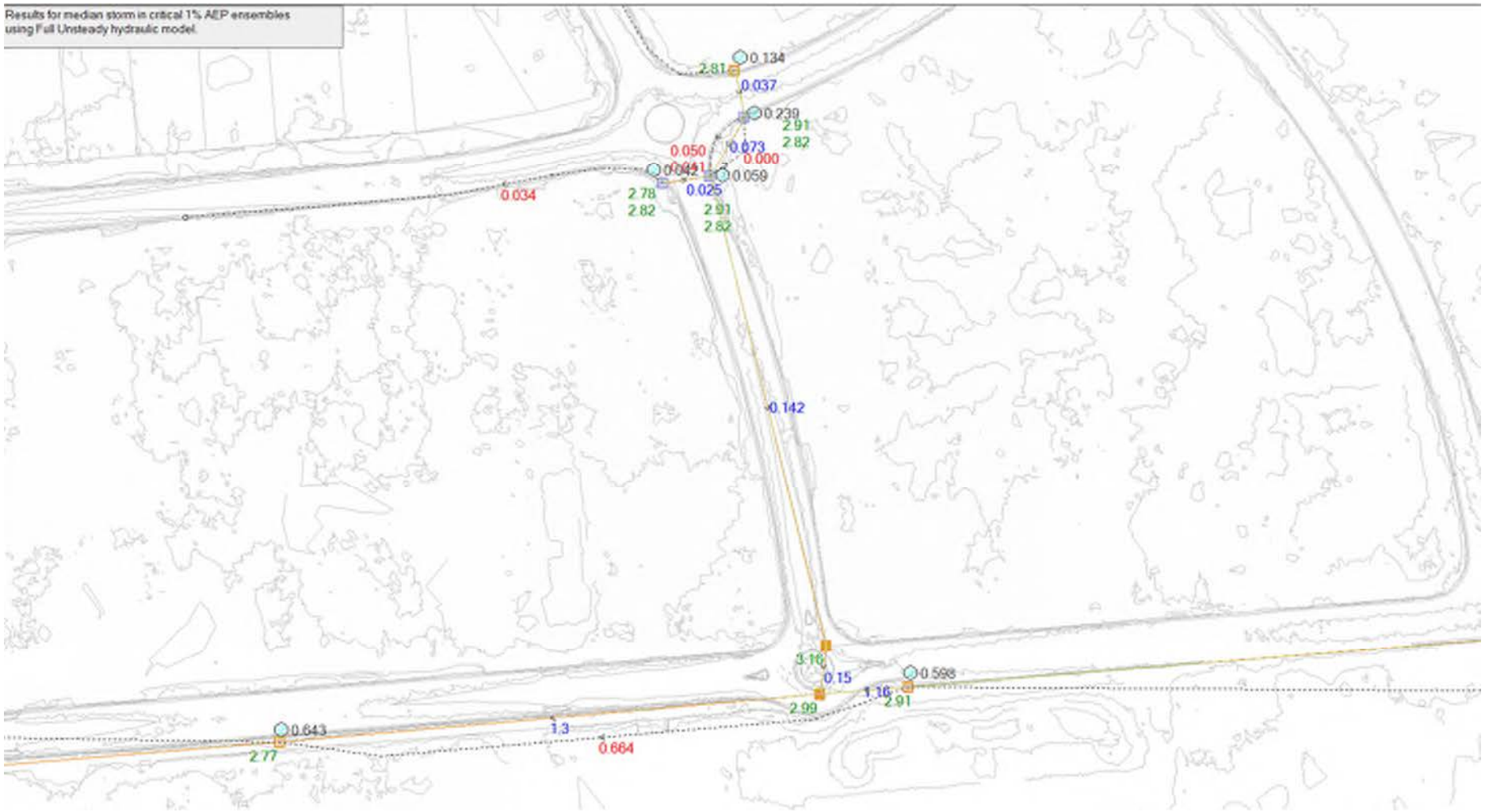

Results for median storm in critical 0.2EY ensembles
using Full Unsteady hydraulic model.


Results for median storm in critical 0.2EY ensembles
using Full Unsteady hydraulic model
0.057
2.61
0.025
0.101
2.70
2.59
0.016
0.064
0.000
0.025
0.018
2.67
2.57
2.67
2.58
0
0.135
1.88
0.136
0.253
0.453
1.92
1.79
0.295
1.64
0.57
0.000
0.32

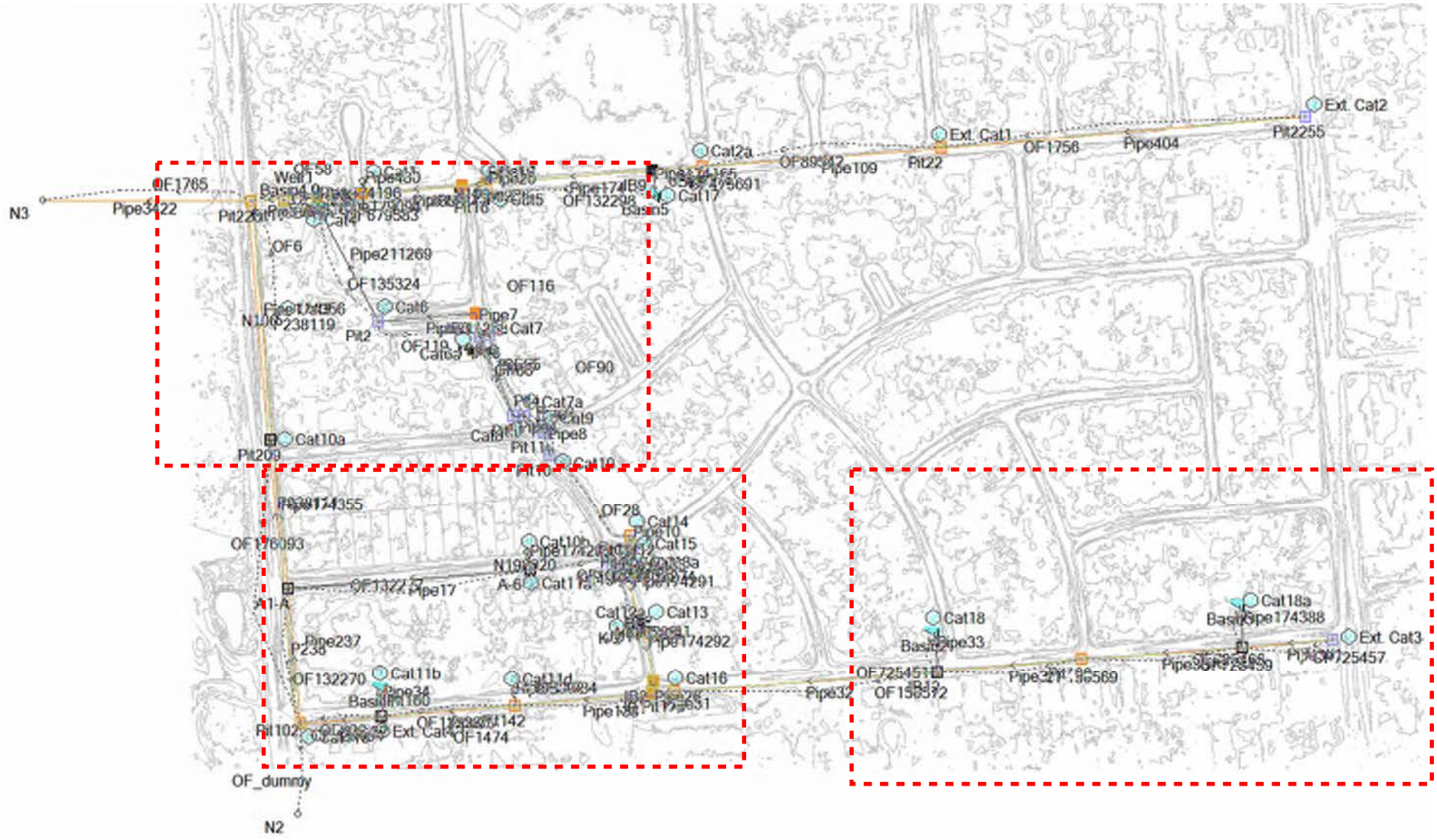
1.2 1 IN 100 YEAR ARI STORM DRAINS RESULTS



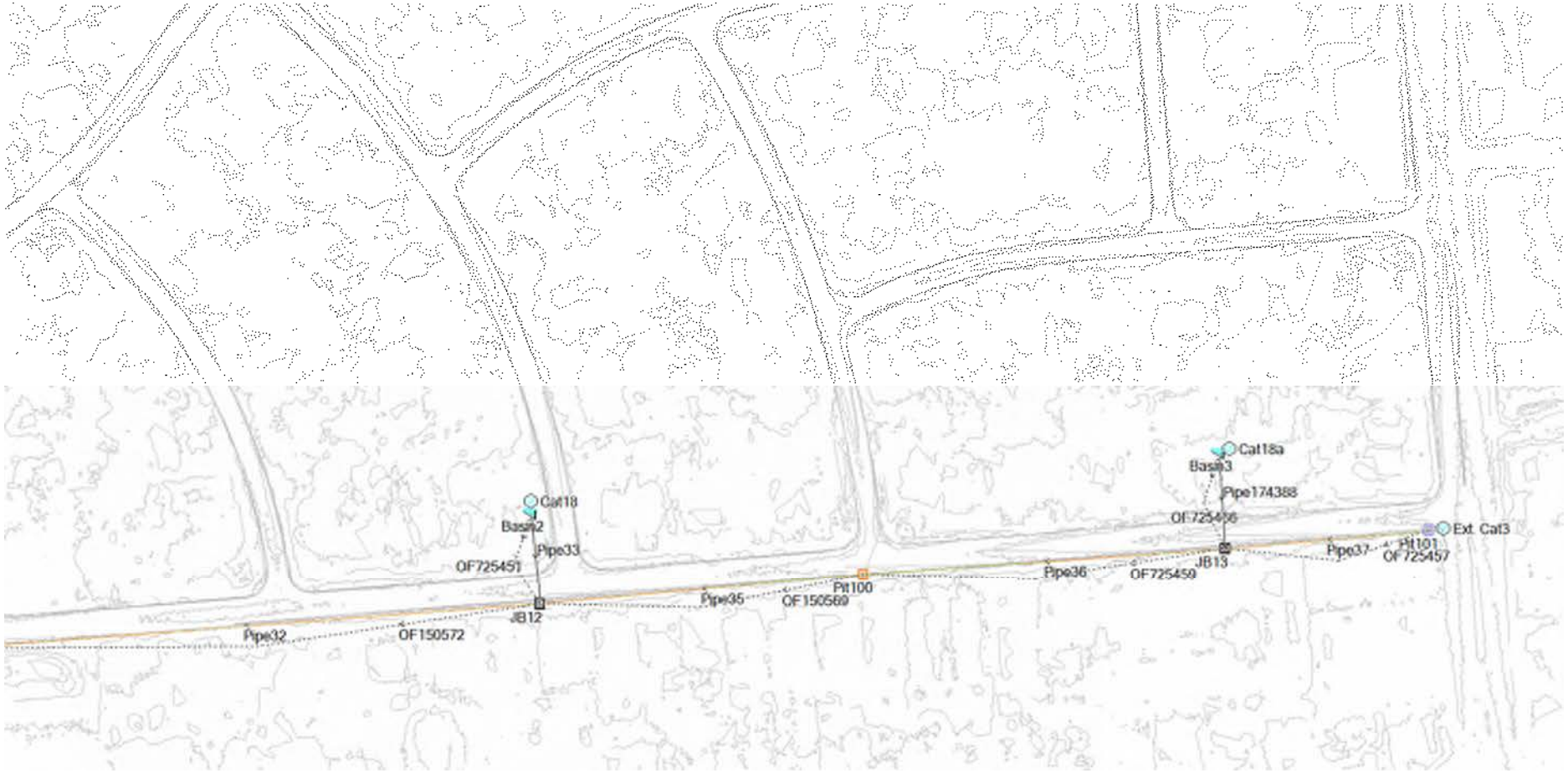

Results for median storm in critical 1% AEP ensembles
using Full Unsteady hydraulic model
0.242
0.243
0.557
0.557
0.921
0.135
0.135
0.037
0.106
0.063
0.084
0.166
0.434
0.403
0.186
0.239
0.046
0.369
0.433
0.097
0.112
0.052
0.395
0.254
0.074
0.132
0.139
0.337
0.096
0.14
0.395
0.442

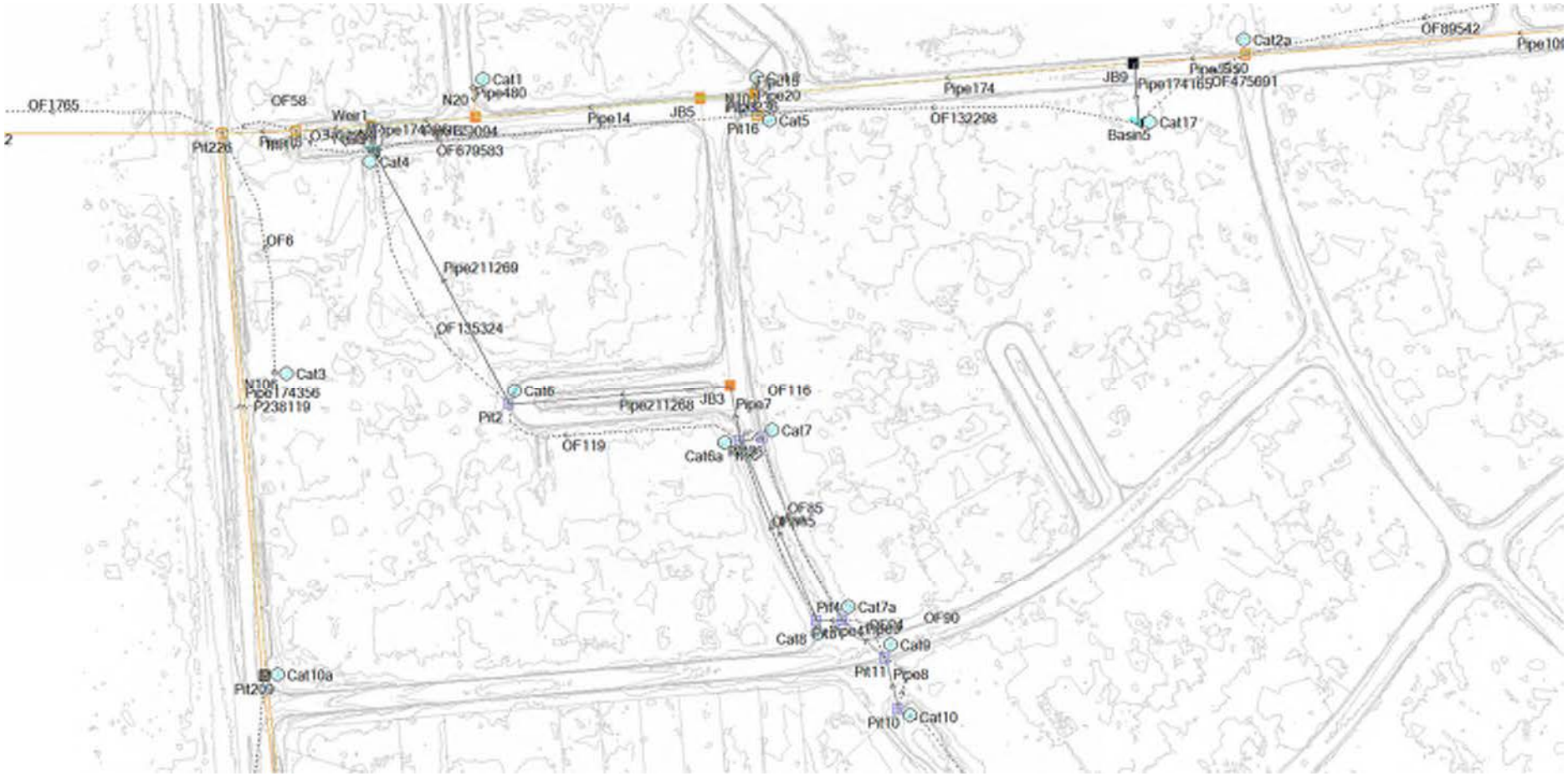

Results for median storm in critical 1% AEP ensembles using Full Unsteady hydraulic model.
0.134
2.81
0.037
0.239
2.91
2.82
0.050
0.073
0.000
0.059
0.025
0.034
2.78
2.82
2.91
2.82
0.142
3.16
0.15
0.598
1.16
2.91
2.99
0.643
2.77
1.3
0.664

2 POST-DEVELOPMENT DRAINS MODEL

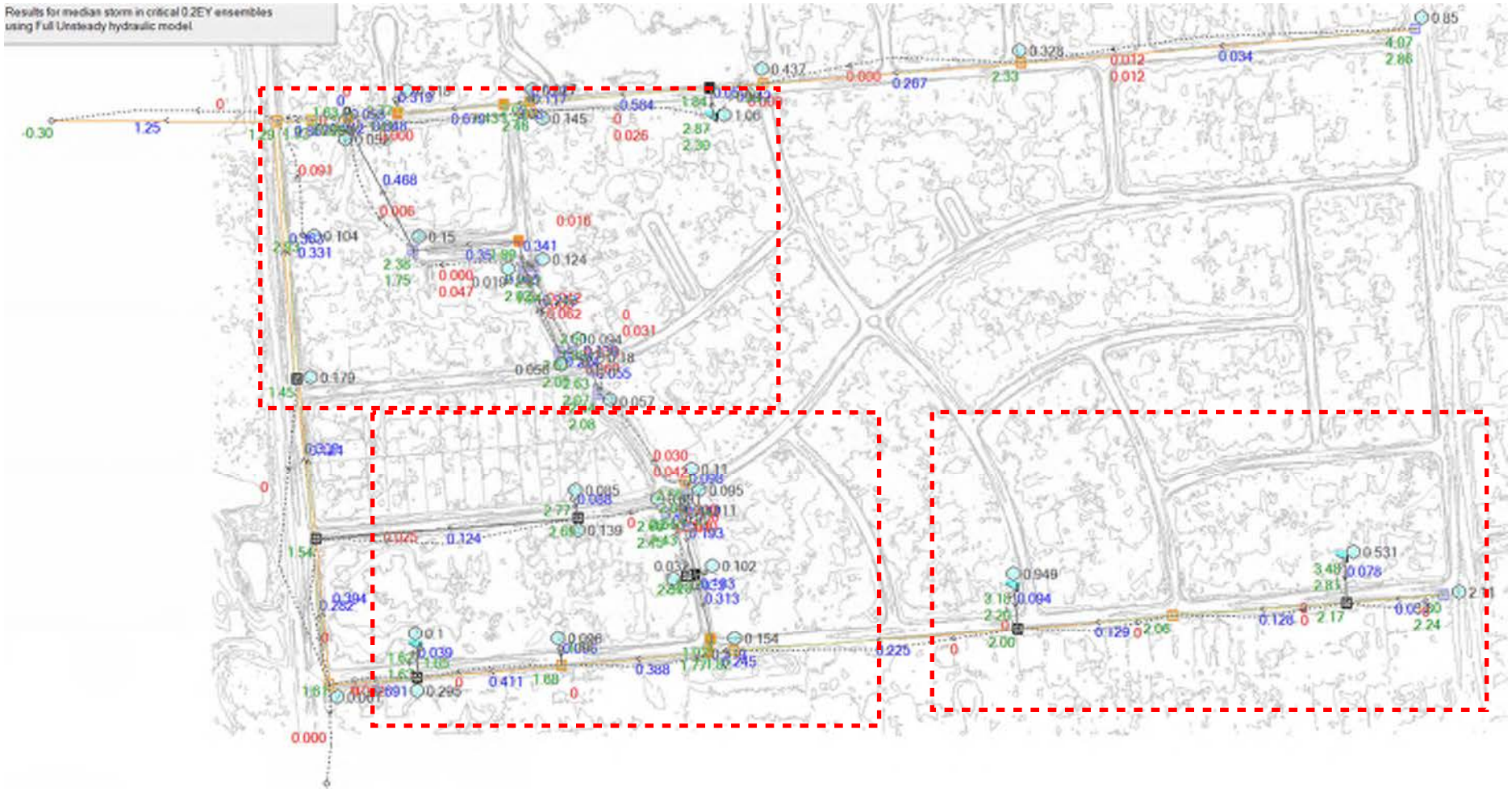


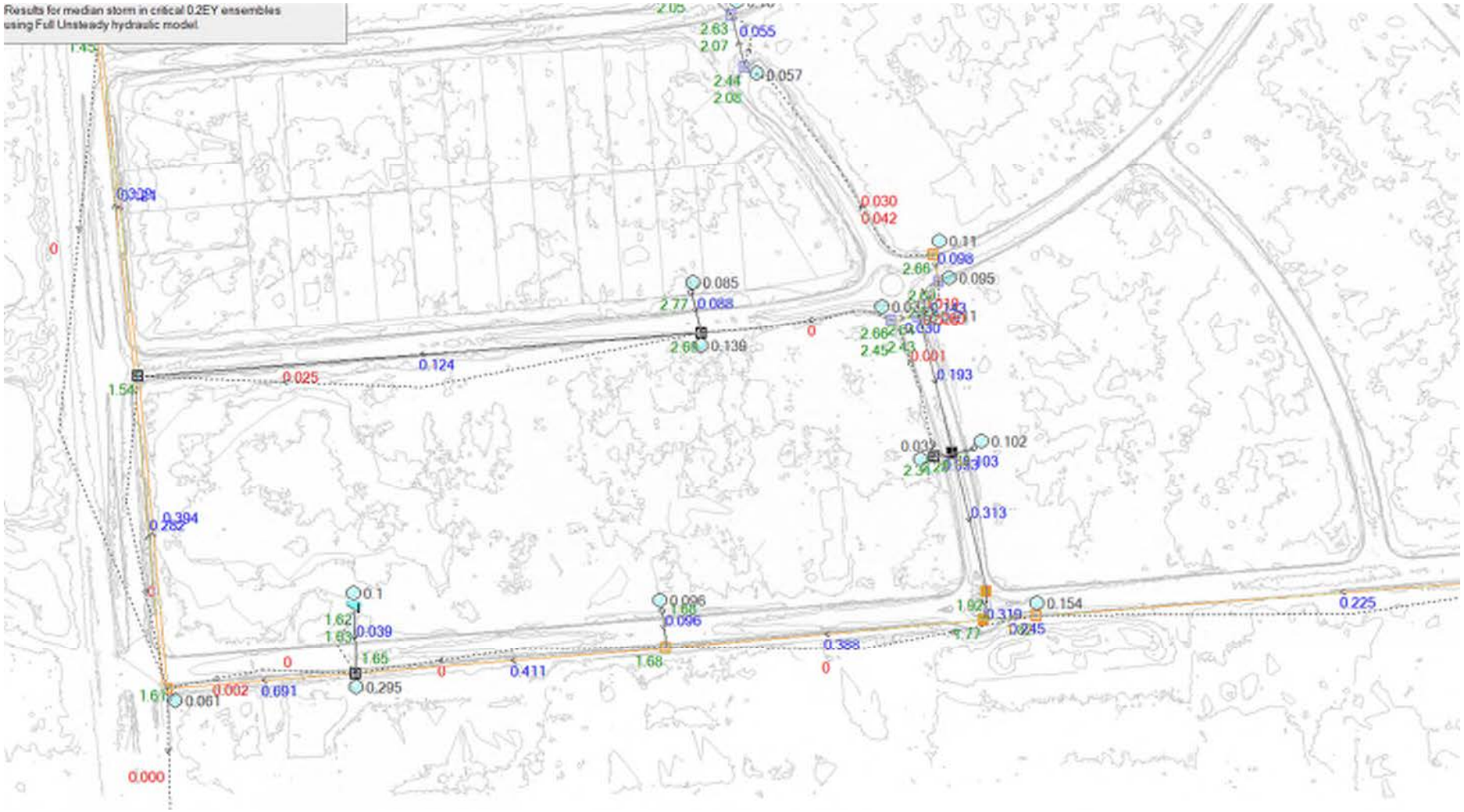

OF28
Cat14
Pipe10
Pit15
Cat15
Cat10b
Pipe174233
A-6
Cat11a
OF132269
Pipe17
OF132277
A1-A
OF132274
Pipe174291
Cat13
Pipe174292
Pipe237
OF132270
Cat11b
Basin1
Pipe34
Cat11d
Pipe174234
JB2
Pipe26
Cat16
JB1
Pipe138
OF725454
Pit160
OF132280
Pipe23
Pit142
OF1474
Pit102
Cat11e
OF132
Pipe22
Ext. Cat4


Cat18a
Basin3
Pipe174388
OF725456
Ext. Cat3
Cat18
Basin2
Pipe33
OF725451
Pipe37
Pit101
OF725457
JB13
Pipe36
OF725459
Pipe35
Pit100
OF150569
JB12
Pipe32
OF150572

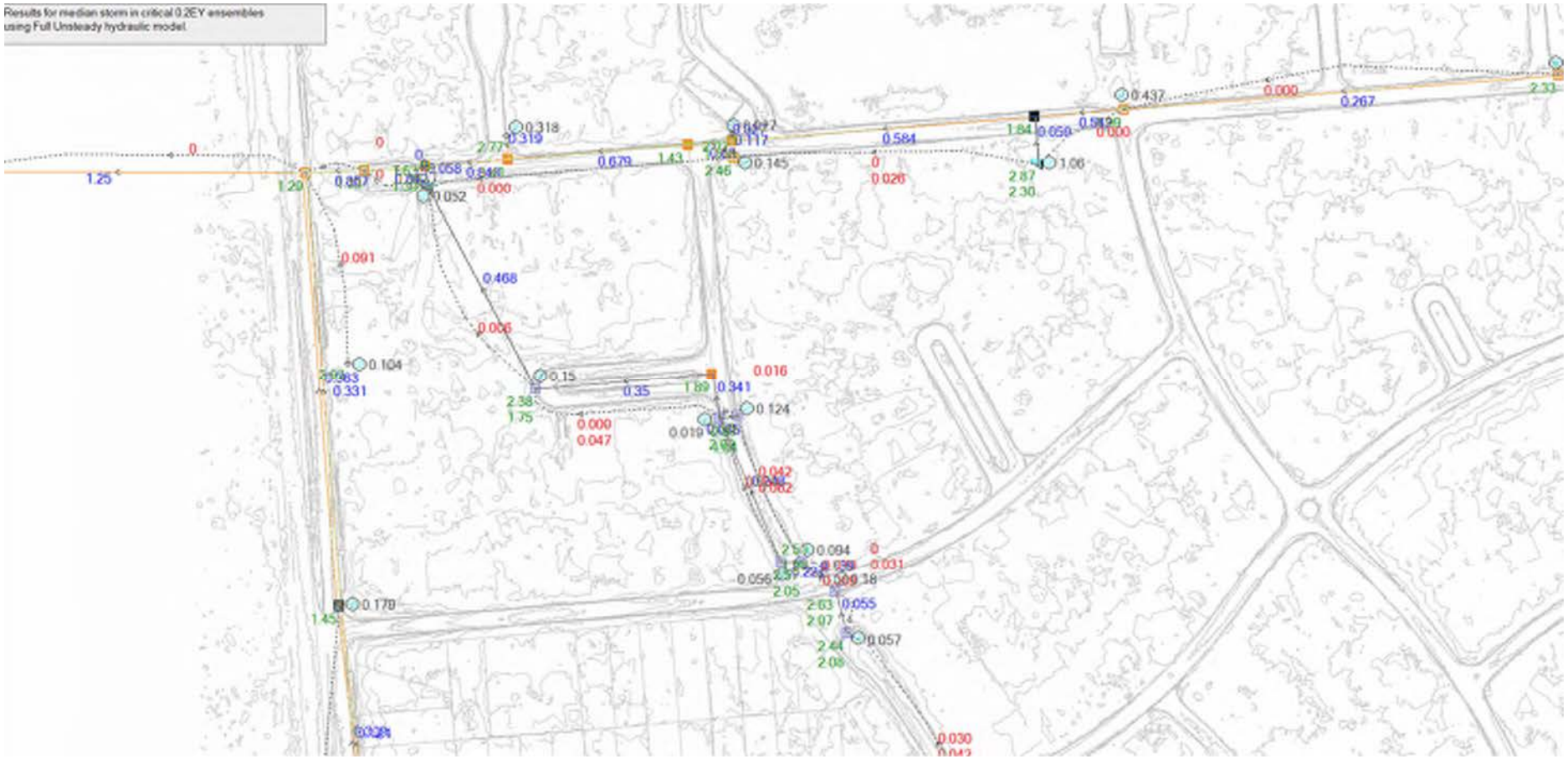

OF1765
OF58
Weir1
Cat1
Pipe480
N20
Pipe14
JB5
Pipe174
OF132298
JB9
Cat17
Basin5
Cat2a
OF89542
Pipe174165
OF475691
Pit16
Cat5
Pit226
Cat4
OF679583
OF6
Pipe211269
OF135324
Cat3
Pipe174356
P238119
Cat6
Pipe211268
JB3
Pipe7
OF116
Pit2
OF119
Cat7
Cat6a
OF85
Pit4
Cat7a
OF90
Cat8
Cat9
Pit11
Pipe8
Pit209
Cat10a
Pit10
Cat10

2.1 1 IN 5 YEAR ARI STORM DRAINS RESULTS

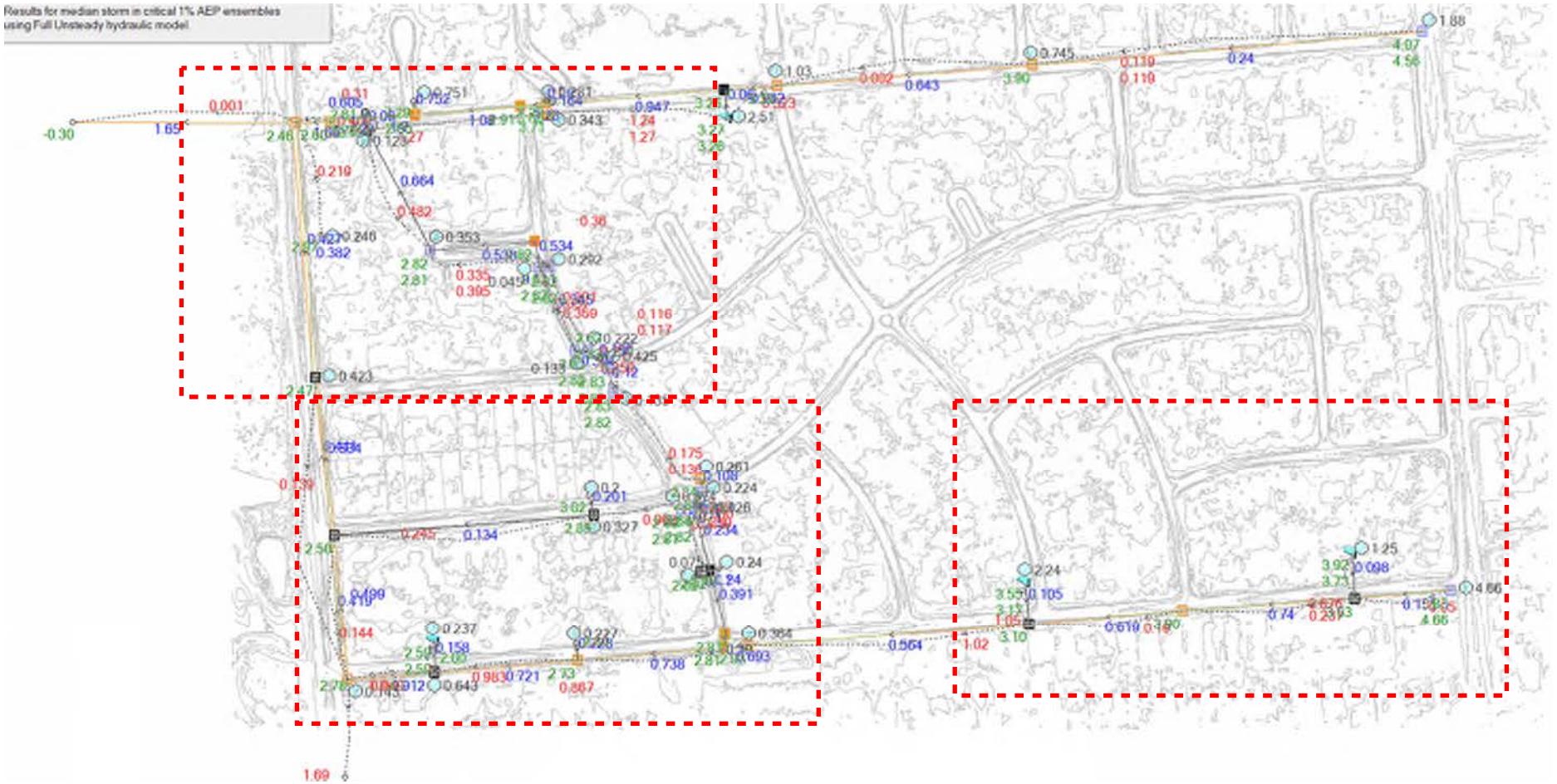


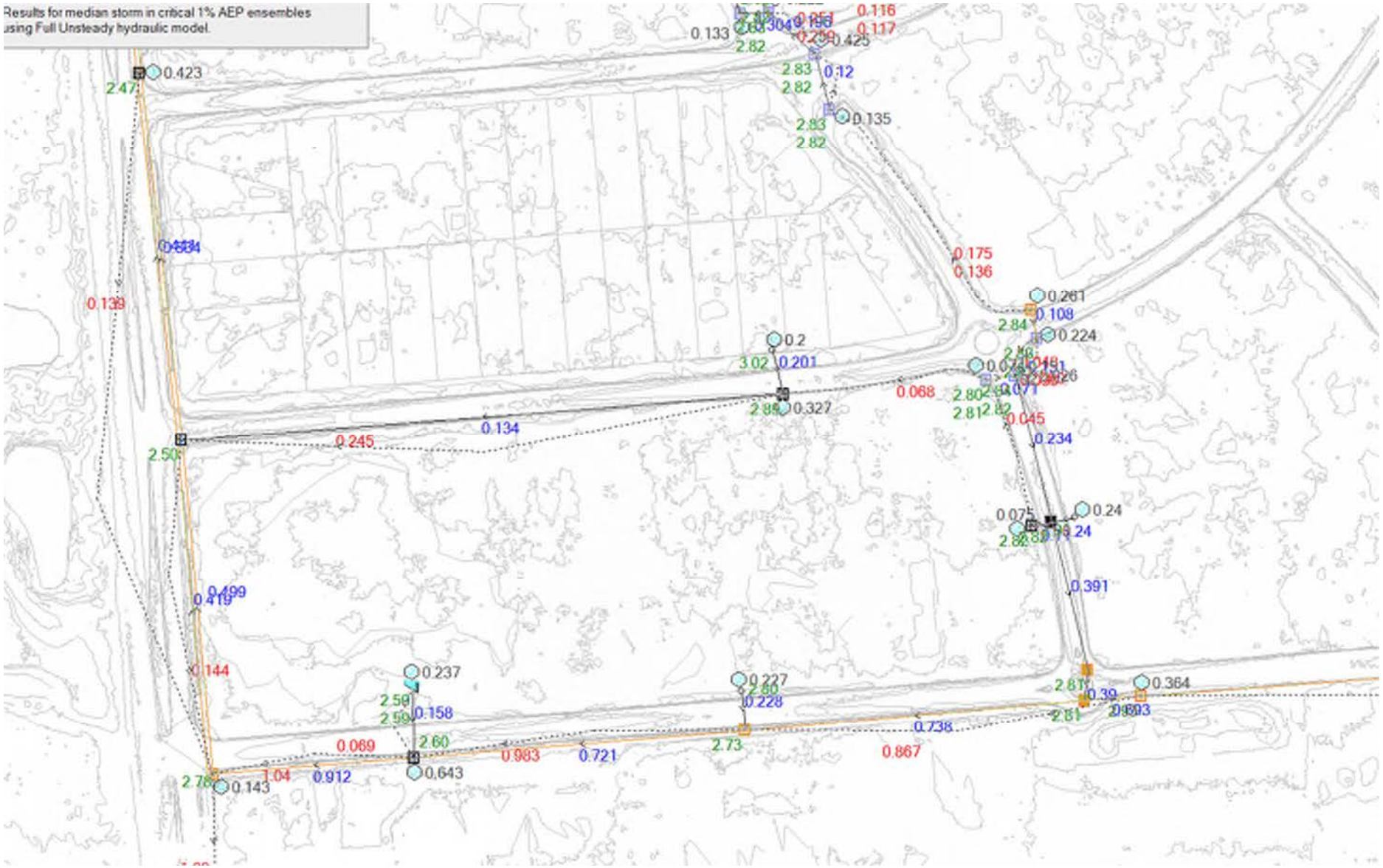

Results for median storm in critical 0.2EY ensembles
using Full Unsteady hydraulic model
0.055
0.057
0.030
0.042
0.11
0.098
0.085
0.085
0.088
0.139
0.124
0.025
0.001
0.193
0.102
0.313
0.394
0.1
0.039
0.096
0.154
0.225
0.319
0.245
0.388
0.411
0.002
0.691
0.295
0.061
0.000

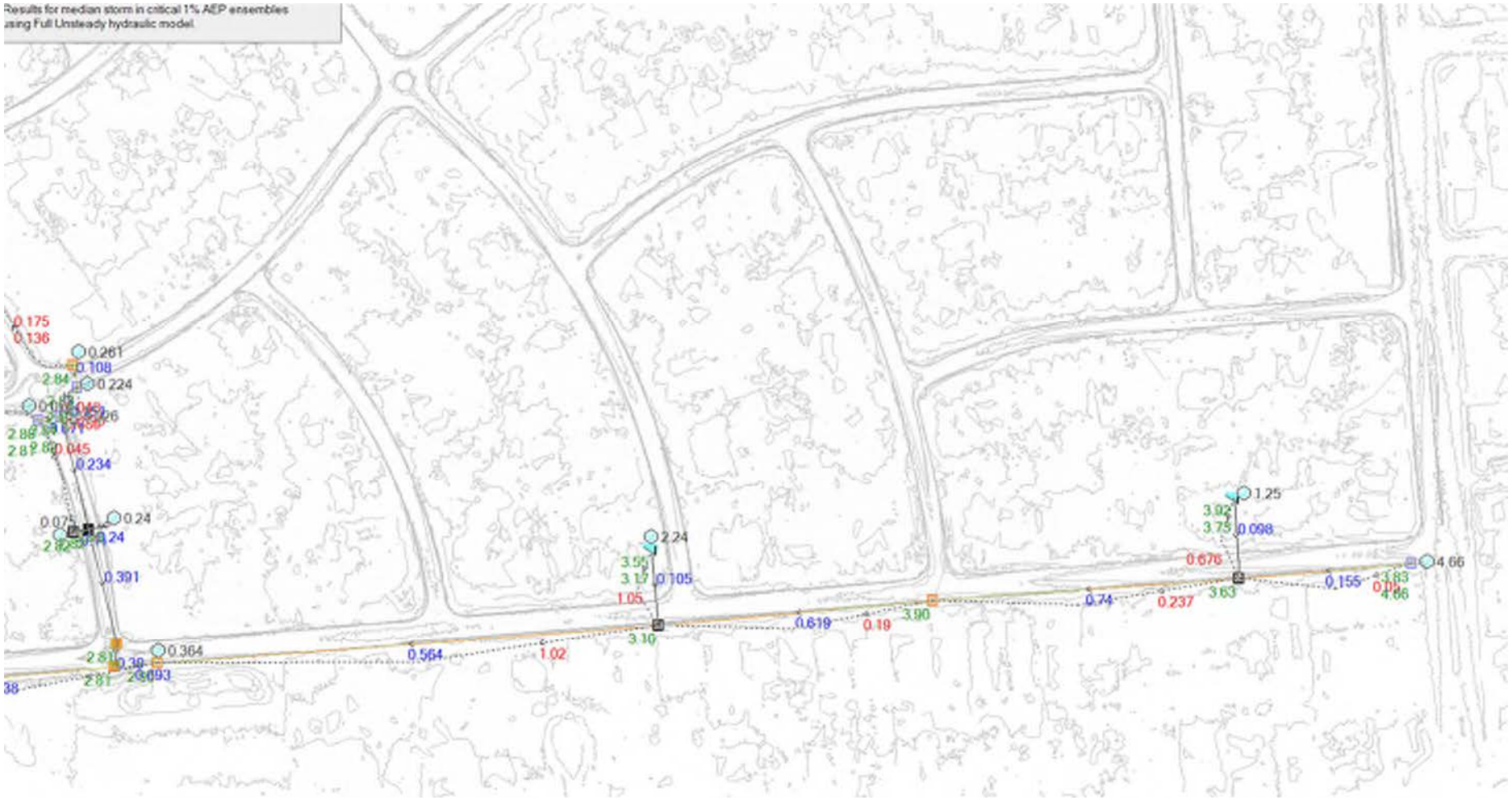

Results for median storm in critical 0.2EY ensembles
using Full Unsteady hydraulic model
0.949
3.18
2.20
0.094
0
0.225
0
2.00
0.129
0
2.06
0.128
0
2.17
0.531
3.49
2.81
0.078
0
0.057
0
3.80
2.24
2.11

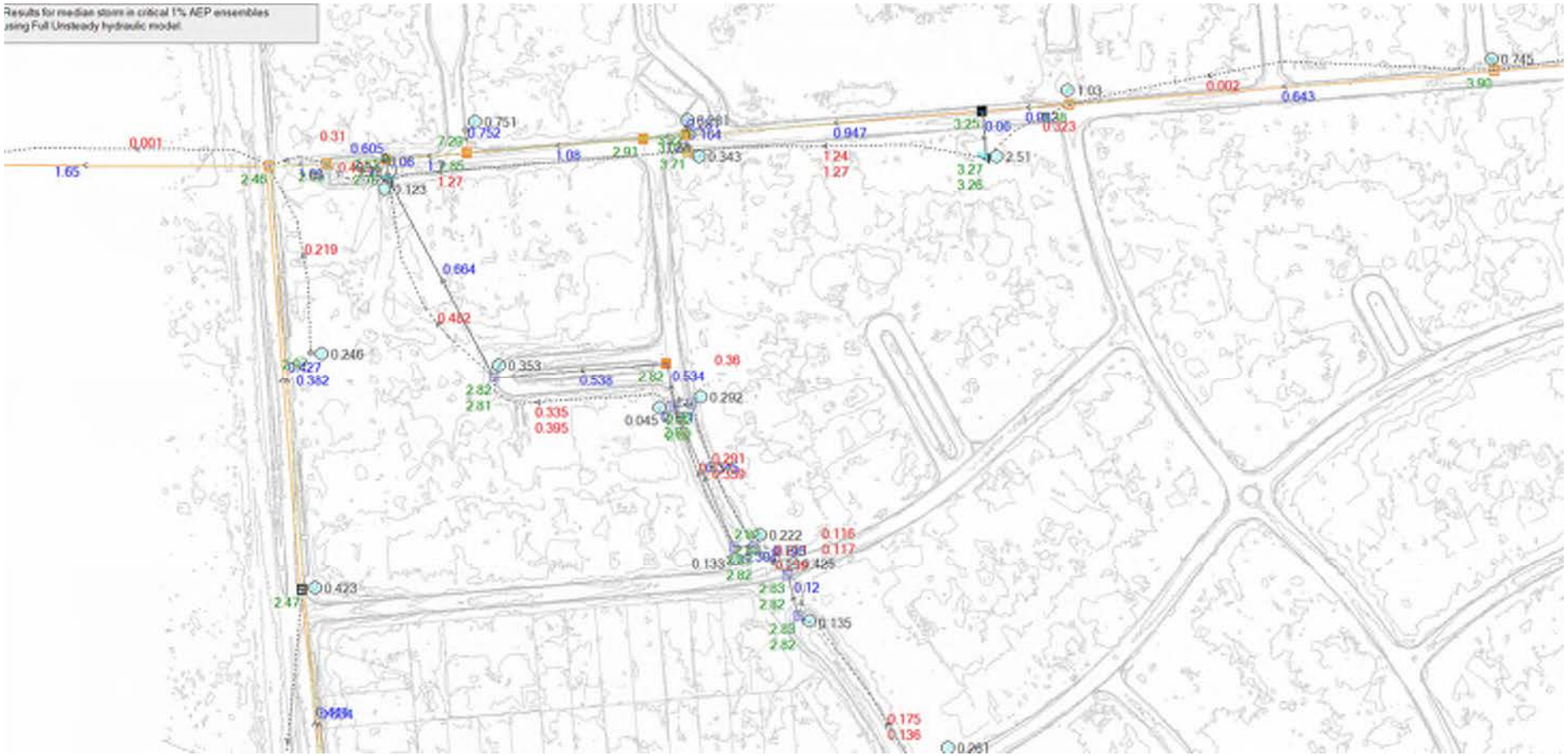

Results for median storm in critical 0.2EY ensembles
using Full Unsteady hydraulic model

2.2 1 IN 100 YEAR ARI STORM DRAINS RESULTS




Results for median storm in critical 1% AEP ensembles
using Full Unsteady hydraulic model.
0.423
0.133
0.116
0.117
0.425
0.135
0.12
0.175
0.136
0.261
0.108
0.224
0.2
0.201
0.327
0.068
0.045
0.234
0.24
0.391
0.134
0.245
0.499
0.144
0.237
0.158
0.227
0.228
0.364
0.738
0.867
0.069
0.983
0.721
0.912
0.643
0.143


Results for median storm in critical 1% AEP ensembles
using Full Unsteady hydraulic model
0.175
0.136
0.261
0.108
2.84
0.224
0.045
0.234
0.075
0.24
0.24
0.391
0.364
0.564
1.02
2.24
3.55
3.17
0.105
1.05
3.10
0.619
0.19
3.90
0.74
0.237
1.25
3.92
3.75
0.098
0.676
3.63
0.155
3.83
4.66


Results for median storm in critical 1% AEP ensembles
using Full Unsteady hydraulic model
0.001
1.65
0.31
0.605
0.751
0.752
0.343
0.947
1.24
1.27
1.03
0.002
0.643
0.745
3.90
0.323
2.51
3.27
3.26
0.123
0.219
0.664
0.482
0.246
0.427
0.382
0.353
0.538
0.534
0.36
0.292
0.335
0.395
0.045
0.201
0.222
0.116
0.117
0.139
0.425
0.423
2.47
0.12
0.135
0.175
0.136
0.261

DRAINS PRE-DEVELOPMENT DRAINS INPUT DATA

PIT / NODE DETAILS

Version 15

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligned	Minor Safe Pond Depth (m)	Major Safe Pond Depth (m)
Pit2	Sag	City of Cha	Charles Stu	0.559	4	2.16	0.2	0	0.5	271973.2	6137172	No	1	1 x Ku	No	Existing		No	0.2	0.2
JB3	OnGrade	Junction Pit	Junction Pit or Manhole		0.7	2.65		0	0.2	272048.7	6137178	Yes	6	1 x Ku	No	Existing				
JB4	OnGrade	Junction Pit	Junction Pit or Manhole		0.2	2.5		0	0.2	272044.4	6137221	Yes	8	1 x Ku	No	Existing		No		
JB5	OnGrade	Junction Pit	Junction Pit or Manhole		0.7	2.71		0	0.2	272038.5	6137276	Yes	7	1 x Ku	No	Existing				
JB8	OnGrade	Junction Pit	Junction Pit or Manhole		0.7	2.85		0	0.2	271961.7	6137270	Yes	855	1 x Ku	No	Existing				
JB6	OnGrade	Junction Pit	Junction Pit or Manhole		0.7	2.61		0	0.2	271926.2	6137267	Yes	18	1 x Ku	No	Existing				
Pit17	OnGrade	City of Cha	Charles Sturt	Single Pit	1.5	2.48		0	0.2	271900.4	6137265	No	16	1 x Ku	No	Existing				
Pit21	OnGrade	GP	GP infi		2.2	2.42		0	0.2	271875.2	6137264	No	359601	1 x Ku	No	Existing				
N3	Node					0.5		0		271662.4	6137261		359610		No					
Pit3	Sag	City of Cha	Charles Stu	1	4	2.28	0.17	0	0.5	272059.9	6137160	No	2	1 x Ku	No	Existing		No	0.17	0.17
Pit6	Sag	City of Cha	Charles Stu	1	2.2	2.28	0.08	0	0.5	272052.1	6137159	No	5	1 x Ku	No	Existing		No	0.08	0.08
Pit10	Sag	City of Cha	Charles Stu	10.758	4	2.31	0.39	0	0.5	272106.1	6137067	No	9	1 x Ku	No	Existing		No	0.39	0.39
Pit11	Sag	City of Cha	Charles Stu	3	1.7	2.38	0.16	0	0.5	272101.6	6137085	No	10	1 x Ku	No	Existing		No	0.16	0.16
Pit5	Sag	City of Cha	Charles Stu	1	1.8	2.33	0.15	0	0.5	272087.5	6137098	No	4	1 x Ku	No	Existing		No	0.15	0.15
Pit4	Sag	City of Cha	Charles Stu	0.1	1.7	2.39	0.07	0	0.5	272078.2	6137098	No	3	1 x Ku	No	Existing		No	0.07	0.07
Pit15	OnGrade	City of Cha	Charles Sturt	Single Pit	3.4	2.59		0	0.2	272169.2	6137005	No	14	1 x Ku	No	Existing		No		
Pit44	Sag	City of Cha	Charles Stu	1	1.3	2.58	0.05	0	0.5	272171.1	6136996	No	207	1 x Ku	No	Existing			0.05	0.05
Pit49	Sag	GP	450x600 GI	1	2.6	2.57	0.06	0	0.5	272164.3	6136984	No	220	1 x Ku	No	Existing		No	0.06	0.06
JB2	OnGrade	Junction Pit	Junction Pit or Manhole		0.7	2.8		0	0	272187.1	6136891	Yes	30	1 x Ku	No	Existing				
JB1	OnGrade	Junction Pit	Junction Pit or Manhole		1.5	3		0	0.2	272186	6136882	Yes	15	1 x Ku	No	Existing				
Pit142	OnGrade	City of Cha	Charles Sturt	Single Pit	1.4	2.4		0	0.2	272079.7	6136872	No	43430728	1 x Ku	No	Existing				
Pit102	OnGrade	GP	GP infi		1.7	2.16		0	0.2	271912.7	6136859	No	359406	1 x Ku	No	Existing		No		
Pit18	OnGrade	City of Cha	Charles Sturt	Single Pit	1.8	2.58		0	0.2	271926.8	6137260	No	17	1 x Ku	No	Existing		No		
Pit48	Sag	City of Cha	Charles Stu	1	4	2.6	0.08	0	0.5	272155.1	6136982	No	218	1 x Ku	No	Existing			0.08	0.08
N101	Node					2.62		0		272057	6137280		617		No					
Pit23	OnGrade	Junction Pit	Junction Pit or Manhole		1.1	2.9		0	0.2	272057.1	6137278	Yes	22	1 x Ku	No	Existing		No		
N106	Node							0		271893.1	6137183		681		No					
N110	Node					2.66		0		272058.5	6137271		700		No					
N125	Node							0		272061.2	6136976		771		No					
N139	Node							0		271867	6137399		935		No					
Pit101	Sag	GP	GP infi	6757.5	4	3.67	0.15	0	0.5	272714	6136924	No	359374	1 x Ku	No	Existing		No	0.15	0.15
Pit100	OnGrade	GP	GP infi		1.4	3.08		0	0.2	272519.2	6136909	No	359385	1 x Ku	No	Existing		No		
Pit163	OnGrade	GP	GP infi		1.4	2.69		0	0.2	272203.3	6136883	No	47190185	1 x Ku	No	Existing		No		
Pit2255	Sag	GP	GP infi	6944.4	4	4	0.15	0	0.5	272693.1	6137330	No	359468	1 x Ku	No	Existing		No	0.15	0.15
Pit22	OnGrade	GP	GP infi		1.4	3.8		0	0.2	272410.6	6137306	No	359474	1 x Ku	No	Existing		No		
JB10	OnGrade	GP	GP infi		1.4	3		0	0.2	272224.5	6137291	No	35300384	1 x Ku	No	Existing		No		
N197	Node					2.53		0		271960.6	6137280		46703038		No					
N2	Node					2.2		0		271918.5	6136773		56532351		No					

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Lengt	id

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	EIA %	Perv Area %	RIA %	EIA Time (min)	Perv Time (min)	RIA Time (min)	EIA Length (m)	Perv Length (m)	RIA Length (m)	EIA Slope(%) %	Perv Slope %	RIA Slope %	EIA Rough	Perv Rough	RIA Rough	Rainfall Multiplier
Cat6	Pit2	1.21	42.3	49.7	8	5	10	2										1
Cat1b	Pit17	0.036	100	0	0	5	10	2										1
Cat7	Pit3	0.51	40.9	51	8.1	5	10	2										1
Cat6a	Pit6	0.13	71	18	11	5	10	2										1
Cat10	Pit10	0.6	50	41.8	8.2	5	10	2										1
Cat9	Pit11	1.313	55	33.4	11.6	5	10	2										1
Cat7a	Pit5	1.45	37.5	56.9	5.7	5	10	2										1
Cat8	Pit4	0.46	34.6	59.8	5.6	5	10	2										1
Cat14	Pit15	0.71	40.5	52.1	7.4	5	10	2										1
Cat15	Pit44	1.63	31.4	63	5.6	5	10	2										1
Cat13	Pit49	0.281	44.9	47.5	7.6	5	10	2										1
Ext. Cat4	Pit142	4.233	60	25	15	18	33	18										1
Cat11	Pit102	3.73	29.5	66.1	4.4	5	10	2										1
Cat4	Pit18	0.59	38.6	54.6	6.8	5	10	2										1
Cat12	Pit48	0.26	34.5	61.4	4.1	5	10	2										1
Cat 2	N101	4.48	19.5	78.3	2.2	5	10	2										1
Cat3	N106	1.29	31	62.6	6.4	5	10	2										1
Cat5	N110	0.98	29.5	65.3	5.3	5	10	2										1
Cat1a	N139	0.592	34	57.5	8.5	5	10	2										1
Ext. Cat3	Pit101	35.03	65.8	21.4	12.8	27	42	27										1
Cat18	Pit100	6.91	38.8	54.7	6.5	5	10	2										1
Cat16	Pit163	3.15	40.7	53	6.4	5	10	2										1
Ext. Cat2	Pit2255	14.13	65.8	21.4	12.8	27	42	27										1
Ext. Cat1	Pit22	3.3	65.4	21.6	13	10	25	10										1
Cat17	JB10	7.055	35.9	57.8	6.3	5	10	2										1
Cat1	N197	1.464	35.5	57.7	6.8	5	10	2										1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	Rl (m)	Chg (m)	RL (m)	etc (m)
Pipe1	Pit2	JB3	72.281	1.396	1.035	0.5	Concrete, u	225	225	0.013	Existing	1	Pit2		0				
Pipe2	JB3	JB4	41.796	1.035	0.91	0.3	Concrete, u	750	750	0.013	Existing	1	JB3		0				
Pipe3	JB4	JB5	52.604	0.91	0.752	0.3	Concrete, u	750	750	0.013	Existing	1	JB4		0				
Pipe14	JB5	JB8	77	0.752	0.521	0.3	Box culvert	1.2W x 0.75H		0.012	Existing	1	JB5		0				
Pipe479	JB8	JB6	35	0.521	0.416	0.3	Box culvert	1.2W x 0.75H		0.012	Existing	1	JB8		0				
Pipe15	JB6	Pit17	24.641	0.416	0.342	0.3	Box culvert	1.2W x 0.75H		0.012	Existing	1	JB6		0				
Pipe16	Pit17	Pit21	24.626	0.342	0.268	0.3	Box culvert	1.2W x 0.75H		0.012	Existing	1	Pit17		0				
Pipe3422	Pit21	N3	702	0.268	-1.136	0.2	Box culvert	1.2W x 0.75H		0.012	Existing	1	Pit21		0				
Pipe6	Pit3	Pit6	7.554	1.67	1.27	5.3	Concrete, u	450	450	0.013	Existing	1	Pit3		0				
Pipe7	Pit6	JB3	18.346	1.09	1.035	0.3	Concrete, u	750	750	0.013	Existing	1	Pit6		0				
Pipe8	Pit10	Pit11	17.18	1.822	1.77	0.3	Concrete, u	375	375	0.013	Existing	1	Pit10		0				
Pipe9	Pit11	Pit5	18.427	1.77	1.68	0.49	Concrete, u	375	375	0.013	Existing	1	Pit11		0				
Pipe4	Pit5	Pit4	8.7	1.64	1.63	0.11	Concrete, u	375	375	0.013	Existing	1	Pit5		0				
Pipe5	Pit4	Pit6	63.632	1.42	1.27	0.24	Concrete, u	375	375	0.013	Existing	1	Pit4		0				
Pipe10	Pit15	Pit44	8.909	2.015	1.97	0.51	Concrete, u	375	375	0.013	Existing	1	Pit15		0				
Pipe136	Pit44	Pit49	13	1.97	1.79	1.38	Box culvert	0.45W x 0.3H		0.012	Existing	1	Pit44		0				
Pipe137	Pit49	JB2	95	1.79	1.425	0.38	Concrete, u	375	375	0.013	Existing	1	Pit49		0				
Pipe26	JB2	JB1	9.054	1.425	1.38	0.5	Concrete, u	375	375	0.013	Existing	1	JB2		0				
Pipe138	JB1	Pit142	106.5	1.38	1.26	0.11	Box culvert	1.35W x 0.675H		0.012	Existing	1	JB1		0				
Pipe139	Pit142	Pit102	167.95	1.25	0.853	0.24	Box culvert	1.35W x 0.675H		0.012	Existing	1	Pit142		0				
Pipe3377	Pit102	Pit21	405.3	0.853	0.268	0.14	Concrete, u	600	600	0.013	Existing	2	Pit102		0				
Pipe3378	Pit102	Pit21	405.3	0.853	0.268	0.14	Concrete, u	750	750	0.013	Existing	1	Pit102		0				
Pipe17	Pit18	JB6	6.972	1.29	1.255	0.5	uPVC, unde	225	242	0.012	Existing	1	Pit18		0				
Pipe135	Pit48	Pit49	8	1.97	1.89	1	Box culvert	0.45W x 0.225H		0.012	Existing	1	Pit48		0				
Pipe19	N101	Pit23	2.386	1.895	1.883	0.5	Concrete, u	300	300	0.013	Existing	1	N101		0				
Pipe236	Pit23	JB5	18	0.842	0.752	0.5	Concrete, u	825	825	0.013	Existing	1	Pit23		0				
Pipe20	N110	Pit23	6.872	1.917	1.883	0.49	Concrete, u	300	300	0.013	Existing	1	N110		0				
Pipe29	Pit101	Pit100	187.13	2.02	1.699	0.17	Concrete, u	900	900	0.013	Existing	1	Pit101		0				
Pipe177	Pit100	Pit163	301.968	1.699	1.397	0.1	Concrete, u	900	900	0.013	Existing	1	Pit100		0				
Pipe178	Pit163	JB1	16.88	1.397	1.38	0.1	Concrete, u	900	900	0.013	Existing	1	Pit163		0				
Pipe404	Pit2255	Pit22	258	2.699	1.925	0.3	Concrete, u	825	825	0.013	Existing	1	Pit2255		0				
Pipe109	Pit22	JB10	197.345	1.925	1.333	0.3	Concrete, u	825	825	0.013	Existing	1	Pit22		0				
Pipe108	JB10	Pit23	163.7	1.333	0.842	0.3	Concrete, u	825	825	0.013	Existing	1	JB10		0				
Pipe480	N197	JB8	9.5	1.55	1.455	1	Concrete, u	300	300	0.013	Existing	1	N197		0				

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Si	Chg (m)	Bottom Elev (m)	Height of Si	Chg (m)	Bottom Elev (m)	Height of Se	etc
			(m)			(m)			(m)	

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storr (m)	Safe Depth Minor Storr (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id	U/S IL	D/S IL	Length (m)
OF14	Pit2	Pit6	2.2				7.5 m roadv	0.3	0.15	0.4	0.09	100	739	2.36	2.28	88.2
OF58	Pit17	Pit21	0.3				4 m wide pa	0.3	0.15	0.4	0.24	0	894	2.48	2.42	24.626
OF1765	Pit21	N3	5.8				4 m wide pa	0.3	0.15	0.4	1	0	359629	2.42	2.4	702
OF116	Pit3	Pit6	0.1				7.5 m roadv	0.3	0.15	0.4	2.18	0	1036	2.45	2.28	7.8
OF119	Pit6	Pit2	1.4				7.5 m roadv	0.3	0.15	0.4	0.23	45	1039	2.36	2.16	88.2
OF90	Pit10	Pit11	0.2				4 m wide pa	0.3	0.15	0.4	0.45	5	993	2.46	2.38	17.8
OF94	Pit11	Pit5	0.2				4 m wide pa	0.3	0.15	0.4	0.93	4	998	2.53	2.33	21.6
OF85	Pit5	Pit3	0.9				7.5 m roadv	0.3	0.15	0.4	0.3	40	986	2.48	2.28	67.2
OF86	Pit4	Pit6	0.9				7.5 m roadv	0.3	0.15	0.4	0.29	0	987	2.46	2.28	66.2
OF28	Pit15	Pit10	1.3				7.5 m roadv	0.3	0.15	0.4	0.3	50	769	2.59	2.31	92.7
OF107	Pit44	Pit49	0.2				7.5 m roadv	0.3	0.15	0.4	0.41	5	1015	2.63	2.57	14.8
OF42	Pit49	Pit44	0.2				7.5 m roadv	0.3	0.15	0.4	0.34	0	787	2.63	2.58	14.8
OF119973	Pit142	Pit102	5.6				8.22m Gler	0.225	0.225	0.6	0.14	0	43977075	2.4	2.16	167.9
OF_dummy	Pit102	N2	0.1				7.5 m roadv	0.3	0.15	0.4	0.6	0	359454	2.16	2.1	10
OF68	Pit18	Pit17	0.5				7.5 m roadv	0.3	0.15	0.4	0.3	40	955	2.58	2.48	33.8
OF109	Pit48	N125	1.7				7.5 m roadv	0.3	0.15	0.4	0.17	0	1020	2.68	2.52	94.6
OF6	N106	Pit21	2.5				7.5 m roadv	0.3	0.15	0.4	0.24	0	684	2.8	2.42	160
OF63	N139	Pit21	2.7				7.5 m roadv	0.3	0.15	0.4	0.14	0	936	2.58	2.42	132.4
OF1709	Pit101	Pit100	4.5				8.22m Gler	0.225	0.225	0.6	0.3	5	359413	3.67	3.08	195.6
OF134461	Pit100	Pit163	10.5				8.22m Gler	0.225	0.225	0.6	0.13	0	47190214	3.08	2.69	302
OF134465	Pit163	Pit142	3.2				8.22m Gler	0.225	0.225	0.6	0.24	0	47190219	2.69	2.4	123.38
OF1756	Pit2255	Pit22	10.9				7m Pedlar S	0.238	0.238	0.6	0.08	2.5	359539	4	3.8	258
OF89542	Pit22	JB10	3.6				7m Pedlar S	0.238	0.238	0.6	0.43	0	36971199	3.8	3	197.3
OF89548	JB10	Pit17	9.7				7m Pedlar S	0.238	0.238	0.6	0.16	0	36971205	3	2.48	322.3

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover	Cover (m)	
Pipe1	Concrete, u	225	0.6	0.51	Unsafe
Pipe2	Concrete, u	750	0.6	0.78	
Pipe3	Concrete, u	750	0.6	0.78	
Pipe14	Box culvert	0	0.6	1.1	
Pipe479	Box culvert	0	0.6	1.33	
Pipe15	Box culvert	0	0.6	1.28	
Pipe16	Box culvert	0	0.6	1.28	
Pipe3422	Box culvert	0	0.6	0.78	
Pipe6	Concrete, u	450	0.6	0.12	Unsafe
Pipe7	Concrete, u	750	0.6	0.38	Unsafe
Pipe8	Concrete, u	375	0.6	0.08	Unsafe
Pipe9	Concrete, u	375	0.6	0.2	Unsafe
Pipe4	Concrete, u	375	0.6	0.28	Unsafe
Pipe5	Concrete, u	375	0.6	0.56	Unsafe
Pipe10	Concrete, u	375	0.6	0.16	Unsafe
Pipe136	Box culvert	0	0.6	0.2	Unsafe
Pipe137	Concrete, u	375	0.6	0.37	Unsafe
Pipe26	Concrete, u	375	0.6	0.97	
Pipe138	Box culvert	0	0.6	0.36	Unsafe
Pipe139	Box culvert	0	0.6	0.37	Unsafe
Pipe3377	Concrete, u	600	0.6	0.66	
Pipe3378	Concrete, u	750	0.6	0.5	Unsafe
Pipe17	uPVC, unde	242	0.5	1.04	
Pipe135	Box culvert	0	0.6	0.3	Unsafe
Pipe19	Concrete, u	300	0.6	0.39	Unsafe
Pipe236	Concrete, u	825	0.6	1.07	
Pipe20	Concrete, u	300	0.6	0.41	Unsafe
Pipe29	Concrete, u	900	0.6	0.41	Unsafe
Pipe177	Concrete, u	900	0.6	0.32	Unsafe
Pipe178	Concrete, u	900	0.6	0.32	Unsafe
Pipe404	Concrete, u	825	0.6	0.42	Unsafe
Pipe109	Concrete, u	825	0.6	0.78	
Pipe108	Concrete, u	825	0.6	0.78	
Pipe480	Concrete, u	300	0.6	0.65	

This model has no pipes with non-return valves

DRAINS PRE-DEVELOPMENT 1% AEP STORM RESULTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivin (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Pit2	2.82	2.78	0.404	0.6	0	0.023	Outlet System
JB3	2.89		0		0		Outlet System
JB4	3.06		0		0		Outlet System
JB5	3.15		0		0		Outlet System
JB8	3.1		0		0		Outlet System
JB6	2.85		0		0		Outlet System
Pit17	2.7		1.894		0	1.001	Outlet System
Pit21	2.61		2.094		0	0.088	Outlet System
N3	-0.3		0.284				
Pit3	2.87	2.8	0.652	0.9	0	0.433	Outlet System
Pit6	2.88	2.77	0.578	0.9	0	0.112	Outlet System
Pit10	2.82	2.79	0.238	10.8	0	0.132	Outlet System
Pit11	2.82	2.78	0.363	2.6	0	0.253	Outlet System
Pit5	2.82	2.81	0.6	0.9	0	0.395	Outlet System
Pit4	2.83	2.81	0.099	0.1	0	0.064	Outlet System
Pit15	2.81		0.172		0	0.101	Outlet System
Pit44	2.82	2.91	0.28	0.9	0	0.05	Outlet System
Pit49	2.82	2.91	0.117	0.9	0	0	Outlet System
JB2	3.16		0		0		Outlet System
JB1	2.99		0		0.01		None
Pit142	2.77		1.805		0	1.276	Outlet System
Pit102	2.59		2.28		0	2.135	Outlet System
Pit18	2.79		0.137		0	0.063	Outlet System
Pit48	2.82	2.78	0.053	0.9	0	0.034	Outlet System
N101	3.93		0.722				
Pit23	3.51		0		0		Outlet System
N106	2.96		0.271				
N110	3.58		0.194				
N139	2.72		0.138				
Pit101	4.25	3.84	4.952	5791.5	0	0.754	Outlet System
Pit100	3.31		1.838		0	0.528	Outlet System
Pit163	2.91		1.536		0	0.664	Outlet System
Pit2255	4.43	4.07	1.998	5521.8	0	0.102	Outlet System
Pit22	3.9		0.832		0	0.001	Outlet System
JB10	3.29		1.606		0	0.999	Outlet System
N197	3.42		0.329				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Cat6	0.239	0.239	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat1b	0.017	0.017	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat7	0.097	0.097	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat6a	0.043	0.043	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat10	0.14	0.14	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat9	0.337	0.337	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat7a	0.254	0.254	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat8	0.074	0.074	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat14	0.134	0.134	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat15	0.239	0.239	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat13	0.059	0.059	0	5	2	10	1% AEP, 5 min burst, Storm 1
Ext. Cat4	0.643	0.643	0.01	18	18	33	1% AEP, 20 min burst, Storm 6
Cat11	0.513	0.513	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat4	0.106	0.106	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat12	0.042	0.042	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat 2	0.557	0.325	0.438	5	2	10	1% AEP, 2 hour burst, Storm 3
Cat3	0.186	0.186	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat5	0.135	0.135	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat1a	0.094	0.094	0	5	2	10	1% AEP, 5 min burst, Storm 1
Ext. Cat3	4.655	4.646	0.305	27	27	42	1% AEP, 30 min burst, Storm 4
Cat18	1.252	1.252	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat16	0.598	0.598	0	5	2	10	1% AEP, 5 min burst, Storm 1
Ext. Cat2	1.878	1.874	0.123	27	27	42	1% AEP, 30 min burst, Storm 4
Ext. Cat1	0.744	0.744	0	10	10	25	1% AEP, 10 min burst, Storm 6
Cat17	1.183	1.183	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat1	0.242	0.242	0	5	2	10	1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe1	0.046	1.15	2.816	2.892	1% AEP, 10 min burst, Storm 9
Pipe2	0.403	0.91	2.892	3.056	1% AEP, 2 hour burst, Storm 1
Pipe3	0.434	0.98	3.056	3.147	1% AEP, 5 min burst, Storm 1
Pipe14	1.557	1.73	3.133	3.101	1% AEP, 10 min burst, Storm 6
Pipe479	1.74	1.93	2.975	2.849	1% AEP, 10 min burst, Storm 6
Pipe15	1.771	1.97	2.762	2.701	1% AEP, 10 min burst, Storm 6
Pipe16	1.812	2.01	2.634	2.612	1% AEP, 10 min burst, Storm 8
Pipe3422	1.692	1.88	2.216	-0.3	1% AEP, 2 hour burst, Storm 3
Pipe6	0.123	0.77	2.867	2.88	1% AEP, 2 hour burst, Storm 1
Pipe7	0.369	0.84	2.88	2.892	1% AEP, 2 hour burst, Storm 1
Pipe8	0.096	0.87	2.818	2.819	1% AEP, 15 min burst, Storm 9
Pipe9	0.105	0.95	2.819	2.82	1% AEP, 10 min burst, Storm 3
Pipe4	0.163	1.48	2.82	2.825	1% AEP, 5 min burst, Storm 1
Pipe5	0.17	1.54	2.825	2.88	1% AEP, 5 min burst, Storm 1
Pipe10	0.037	0.33	2.811	2.823	1% AEP, 5 min burst, Storm 1
Pipe136	0.073	0.54	2.823	2.824	1% AEP, 5 min burst, Storm 1
Pipe137	0.142	1.29	2.824	3.159	1% AEP, 5 min burst, Storm 1
Pipe26	0.15	1.36	3.073	2.986	1% AEP, 5 min burst, Storm 1
Pipe138	1.302	1.43	2.898	2.768	1% AEP, 10 min burst, Storm 10
Pipe139	1.152	1.26	2.716	2.588	1% AEP, 10 min burst, Storm 3
Pipe3377	0.442	0.78	2.588	2.612	1% AEP, 2 hour burst, Storm 3
Pipe3378	0.395	0.9	2.588	2.612	1% AEP, 2 hour burst, Storm 3
Pipe17	0.037	0.81	2.789	2.849	1% AEP, 5 min burst, Storm 1
Pipe135	0.025	0.25	2.822	2.824	1% AEP, 5 min burst, Storm 1
Pipe19	0.557	7.88	3.926	3.505	1% AEP, 2 hour burst, Storm 3
Pipe236	1.455	2.72	3.257	3.147	1% AEP, 5 min burst, Storm 1
Pipe20	0.135	1.9	3.585	3.505	1% AEP, 5 min burst, Storm 1
Pipe29	0.261	0.41	3.811	3.308	1% AEP, 5 min burst, Storm 1
Pipe177	0.77	1.21	3.243	2.905	1% AEP, 10 min burst, Storm 10
Pipe178	1.163	1.83	2.905	2.986	1% AEP, 10 min burst, Storm 6
Pipe404	0.22	0.41	4.235	3.901	1% AEP, 10 min burst, Storm 9
Pipe109	0.704	1.32	3.774	3.287	1% AEP, 5 min burst, Storm 1
Pipe108	0.921	1.72	3.287	3.505	1% AEP, 5 min burst, Storm 1
Pipe480	0.243	3.43	3.423	3.101	1% AEP, 5 min burst, Storm 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF14	0.023	0.07	0.789	0.467	0.04	8.85	0.52	1% AEP, 10 min burst, Storm 6
OF58	1.001	1.001	1.477	0.201	0.27	4	1.35	1% AEP, 2 hour burst, Storm 3
OF1765	0.088	0.014	1.479	0.171	0.03	4	0.6	1% AEP, 2 hour burst, Storm 4
OF116	0.433	0.433	0.968	0.146	0.26	4	1.77	1% AEP, 2 hour burst, Storm 3
OF119	0.112	0.052	1.261	0.55	0.09	8.85	0.7	1% AEP, 15 min burst, Storm 6
OF90	0.132	0.139	1.502	0.369	0.04	4	0.69	1% AEP, 2 hour burst, Storm 3
OF94	0.253	0.256	1.485	0.411	0.08	4	1	1% AEP, 2 hour burst, Storm 3
OF85	0.395	0.382	1.44	0.45	0.17	8.85	0.9	1% AEP, 2 hour burst, Storm 3
OF86	0.064	0.041	1.416	0.434	0.06	8.85	0.63	1% AEP, 15 min burst, Storm 3
OF28	0.101	0.107	1.44	0.39	0.08	8.85	0.68	1% AEP, 2 hour burst, Storm 3
OF107	0.05	0.041	1.546	0.319	0.06	8.58	0.6	1% AEP, 5 min burst, Storm 1
OF42	0	0	1.533	0	0	0	0	
OF119973	1.276	1.283	0.618	0.286	0.22	15.27	0.94	1% AEP, 2 hour burst, Storm 4
OF_dummy	2.135	2.135	1.39	0.305	0.53	8.23	1.72	1% AEP, 2 hour burst, Storm 4
OF68	0.063	0.084	1.44	0.118	0.07	3.07	0.66	1% AEP, 10 min burst, Storm 6
OF109	0.034	0.034	1.084	0.096	0.05	2.33	0.56	1% AEP, 2 hour burst, Storm 3
OF6	0.166	0.162	1.288	0.155	0.11	4.48	0.75	1% AEP, 10 min burst, Storm 3
OF63	0.073	0.085	0.984	0.161	0.07	4.62	0.66	1% AEP, 2 hour burst, Storm 3
OF1709	0.754	0.754	0.905	0.211	0.17	14.22	0.83	1% AEP, 2 hour burst, Storm 1
OF134461	0.528	0.502	0.596	0.223	0.14	15.09	0.79	1% AEP, 2 hour burst, Storm 1
OF134465	0.664	0.666	0.81	0.217	0.16	14.62	0.81	1% AEP, 2 hour burst, Storm 1
OF1756	0.102	0.102	0.516	0.143	0.07	5.14	0.66	1% AEP, 2 hour burst, Storm 1
OF89542	0.001	0.041	1.196	0.088	0.34	2.83	30.47	1% AEP, 15 min burst, Storm 3
OF89548	0.999	0.99	0.73	0.257	0.2	15.05	0.89	1% AEP, 2 hour burst, Storm 3

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level

Run Log for DRAINS v2023.11.8726.15750 - Seaton Predevelopment_Rev3.
{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Seaton Predevelopment_Rev3..drn run at 12:01:20 on 18/3/2025 using Watercom Drains v2023.11.8726.15750

Upwelling occurred at: Pit142, JB10, Pit2255, Pit102, Pit101, Pit48, Pit18, Pit17, Pit15, Pit11, Pit10, Pit6, Pit5, Pit4, Pit3, Pit2
Freeboard was less than 0.15m at Pit163, Pit21, Pit22, Pit100, Pit49, Pit44
The maximum pond depth in these sag pits is unsafe: Pit101, Pit49, Pit48, Pit44, Pit11, Pit10, Pit6, Pit5, Pit4, Pit3, Pit2\line
The maximum flow in these overflow routes is unsafe: OF119973, OF89548, OF_dummy, OF119, OF107, OF94, OF90, OF86, OF85, OF28, OF14

DRAINS PRE-DEVELOPMENT 0.2EY AEP STORM RESULTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Pit2	2.26	2.38	0.091	0.6	0	0	Outlet System
JB3	1.51		0		1.14		None
JB4	1.46		0		1.04		None
JB5	1.45		0		1.26		None
JB8	1.41		0		1.44		None
JB6	1.36		0		1.25		None
Pit17	1.35		0.034		1.13	0.009	Inlet Capacity
Pit21	1.31		0.133		1.11	0	None
N3	-0.3		0				
Pit3	1.88	2.41	0.124	0.9	0.4	0	Inlet Capacity
Pit6	1.56	2.34	0.009	0.8	0.72	0	Inlet Capacity
Pit10	2.49	2.57	0.091	2	0	0.01	Outlet System
Pit11	2.48	2.6	0.154	2.6	0	0.042	Outlet System
Pit5	2.41	2.57	0.171	0.9	0	0.038	Outlet System
Pit4	2.4	2.49	0.037	0.1	0	0.001	Outlet System
Pit15	2.61		0.067		0	0.026	Outlet System
Pit44	2.59	2.7	0.086	0.9	0	0.016	Outlet System
Pit49	2.56	2.67	0.048	0.9	0.01	0	Inlet Capacity
JB2	1.88		0		0.92		None
JB1	1.79		0		1.21		None
Pit142	1.64		0.299		0.76	0.23	Inlet Capacity
Pit102	1.59		0.398		0.57	0.008	Inlet Capacity
Pit18	1.45		0.053		1.13	0.022	Inlet Capacity
Pit48	2.57	2.67	0.021	0.9	0.03	0	Inlet Capacity
N101	2.26		0.205				
Pit23	1.51		0		1.39		None
N106	2.92		0.093				
N110	2.11		0.067				
N139	2.68		0.047				
Pit101	2.26	3.75	2.151	4020.4	1.41	0.138	Inlet Capacity
Pit100	2.21		0.612		0.87	0	None
Pit163	1.92		0.299		0.77	0	Inlet Capacity
Pit2255	2.86	4.07	0.868	1694.6	1.14	0.011	Inlet Capacity
Pit22	2.33		0.348		1.47	0	Inlet Capacity
JB10	1.98		0.593		1.02	0	None
N197	1.82		0.121				

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Cat6	0.101	0.101	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat1b	0.007	0.007	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat7	0.041	0.041	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat6a	0.018	0.018	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat10	0.059	0.059	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat9	0.143	0.143	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat7a	0.107	0.107	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat8	0.031	0.031	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat14	0.057	0.057	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat15	0.101	0.101	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat13	0.025	0.025	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Ext. Cat4	0.295	0.295	0	18	18	33	0.2EY AEP, 20 min burst, Storm 7
Cat11	0.217	0.217	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat4	0.045	0.045	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat12	0.018	0.018	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat 2	0.173	0.173	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat3	0.079	0.079	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat5	0.057	0.057	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat1a	0.04	0.04	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Ext. Cat3	2.106	2.106	0	27	27	42	0.2EY AEP, 30 min burst, Storm 7
Cat18	0.531	0.531	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat16	0.253	0.253	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Ext. Cat2	0.849	0.849	0	27	27	42	0.2EY AEP, 30 min burst, Storm 7
Ext. Cat1	0.328	0.328	0	10	10	25	0.2EY AEP, 15 min burst, Storm 2
Cat17	0.501	0.501	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat1	0.103	0.103	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe1	0.044	1.1	2.063	1.506	0.2EY AEP, 5 min burst, Storm 1
Pipe2	0.26	0.9	1.501	1.464	0.2EY AEP, 15 min burst, Storm 3
Pipe3	0.27	0.77	1.463	1.445	0.2EY AEP, 10 min burst, Storm 9
Pipe14	0.969	1.18	1.436	1.413	0.2EY AEP, 15 min burst, Storm 9
Pipe479	1.011	1.12	1.385	1.356	0.2EY AEP, 15 min burst, Storm 9
Pipe15	1.011	1.12	1.354	1.352	0.2EY AEP, 15 min burst, Storm 9
Pipe16	1.043	1.16	1.317	1.305	0.2EY AEP, 10 min burst, Storm 9
Pipe3422	1.242	1.38	1.087	-0.3	0.2EY AEP, 30 min burst, Storm 9
Pipe6	0.054	0.76	1.875	1.558	0.2EY AEP, 15 min burst, Storm 3
Pipe7	0.216	0.8	1.533	1.506	0.2EY AEP, 15 min burst, Storm 3
Pipe8	0.08	0.73	2.478	2.476	0.2EY AEP, 15 min burst, Storm 7
Pipe9	0.105	0.95	2.443	2.414	0.2EY AEP, 25 min burst, Storm 10
Pipe4	0.155	1.4	2.407	2.404	0.2EY AEP, 5 min burst, Storm 1
Pipe5	0.154	1.7	2.188	1.558	0.2EY AEP, 10 min burst, Storm 3
Pipe10	0.025	0.22	2.592	2.589	0.2EY AEP, 10 min burst, Storm 7
Pipe136	0.064	0.47	2.575	2.565	0.2EY AEP, 10 min burst, Storm 10
Pipe137	0.135	1.22	2.387	1.878	0.2EY AEP, 10 min burst, Storm 2
Pipe26	0.136	1.24	1.836	1.794	0.2EY AEP, 10 min burst, Storm 3
Pipe138	0.57	1.11	1.774	1.642	0.2EY AEP, 15 min burst, Storm 7
Pipe139	0.57	1.09	1.639	1.59	0.2EY AEP, 20 min burst, Storm 5
Pipe3377	0.382	0.67	1.564	1.305	0.2EY AEP, 20 min burst, Storm 7
Pipe3378	0.305	0.7	1.557	1.305	0.2EY AEP, 30 min burst, Storm 9
Pipe17	0.023	0.98	1.417	1.378	0.2EY AEP, 5 min burst, Storm 1
Pipe135	0.018	0.17	2.566	2.565	0.2EY AEP, 5 min burst, Storm 1
Pipe19	0.174	2.49	2.258	2.171	0.2EY AEP, 5 min burst, Storm 1
Pipe236	0.717	1.64	1.471	1.445	0.2EY AEP, 15 min burst, Storm 8
Pipe20	0.058	1.26	2.114	2.068	0.2EY AEP, 5 min burst, Storm 1
Pipe29	0.055	0.41	2.258	2.213	0.2EY AEP, 2 hour burst, Storm 7
Pipe177	0.323	0.88	2.205	1.917	0.2EY AEP, 10 min burst, Storm 3
Pipe178	0.453	1.58	1.917	1.794	0.2EY AEP, 10 min burst, Storm 8
Pipe404	0.04	0.54	2.86	2.328	0.2EY AEP, 2 hour burst, Storm 7
Pipe109	0.264	1.02	2.328	1.976	0.2EY AEP, 15 min burst, Storm 3

Pipe108	0.575	1.45	1.906	1.508	0.2EY AEP, 15 min burst, Storm 8
Pipe480	0.103	1.64	1.817	1.703	0.2EY AEP, 5 min burst, Storm 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF14	0	0.012	0.092	0.074	0.01	1.61	0.13	0.2EY AEP, 10 min burst, Storm 9
OF58	0.009	0.009	0.445	0.023	0.01	4	0.28	0.2EY AEP, 10 min burst, Storm 8
OF1765	0	0	0.908	0	0	0	0	
OF116	0	0	0.453	0	0	0	0	
OF119	0	0.028	0.147	0.151	0.01	4.29	0.05	0.2EY AEP, 10 min burst, Storm 9
OF90	0.01	0.039	0.609	0.195	0.01	4	0.29	0.2EY AEP, 5 min burst, Storm 1
OF94	0.042	0.053	0.876	0.177	0.02	4	0.5	0.2EY AEP, 10 min burst, Storm 9
OF85	0.038	0.045	0.168	0.094	0.05	2.27	0.57	0.2EY AEP, 15 min burst, Storm 3
OF86	0.001	0	0.165	0.014	0	0.16	0	0.2EY AEP, 15 min burst, Storm 10
OF28	0.026	0.045	0.168	0.077	0.04	1.7	0.53	0.2EY AEP, 10 min burst, Storm 1
OF107	0.016	0.016	0.197	0.086	0.03	2.01	0.5	0.2EY AEP, 10 min burst, Storm 3
OF42	0	0	0.179	0	0	0	0	
OF119973	0.23	0.224	0.618	0.164	0.1	8.26	0.75	0.2EY AEP, 20 min burst, Storm 10
OF_dummy	0.008	0.008	0.238	0.05	0.03	0.78	0.54	0.2EY AEP, 45 min burst, Storm 8
OF68	0.022	0.024	0.168	0.079	0.04	1.78	0.53	0.2EY AEP, 5 min burst, Storm 1
OF109	0	0	0.127	0	0	0	0	
OF6	0.069	0.067	0.15	0.118	0.07	3.08	0.64	0.2EY AEP, 10 min burst, Storm 8
OF63	0.032	0.026	0.115	0.099	0.05	2.42	0.55	0.2EY AEP, 10 min burst, Storm 3
OF1709	0.138	0.138	0.905	0.131	0.08	5.29	0.68	0.2EY AEP, 2 hour burst, Storm 7
OF134461	0	0	0.596	0	0	0	0	
OF134465	0	0	0.81	0	0	0	0	
OF1756	0.011	0.01	0.516	0.069	0.02	2.05	0.45	0.2EY AEP, 2 hour burst, Storm 3
OF89542	0	0	1.196	0	0	0	0	
OF89548	0	0	0.73	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level

Run Log for DRAINS v2023.11.8726.15750 - Seaton Predevelopment_Rev3.
{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Seaton Predevelopment_Rev3..drn run at 12:04:11 on 18/3/2025 using Watercom Drains v2023.11.8726.15750

No water upwelling from any pit.
Freeboard was less than 0.15m at Pit49, Pit48, Pit44, Pit15, Pit11, Pit10, Pit5, Pit4, Pit2
The maximum flow in these overflow routes is unsafe: OF119, OF94, OF90

DRAINS POST-DEVELOPMENT DRAINS INPUT DATA

PIT / NODE DETAILS

Version 15

Name	Type	Family	Size	Ponding Volume (cu.m)	Pressure Change Coeff. Ku	Surface Elev (m)	Max Pond Depth (m)	Base Inflow (cu.m/s)	Blocking Factor	x	y	Bolt-down lid	id	Part Full Shock Loss	Inflow Hydrograph	Pit is	Internal Width (mm)	Inflow is Misaligned	Minor Safe Pond Depth (m)	Major Safe Pond Depth (m)
Pit3	Sag	City of Char	Charles Stu	1	4	2.28	0.17	0	0.5	272059.9	6137160	No	2	1 x Ku	No	Existing		No	0.17	0.17
Pit6	Sag	City of Char	Charles Stu	1	2	2.28	0.08	0	0.5	272052.1	6137159	No	5	1 x Ku	No	Existing		No	0.08	0.08
JB3	OnGrade	Junction Pit	Junction Pit or Manhole		1.7	2.65		0	0.2	272048.7	6137178	Yes	6	1 x Ku	No	Existing		Yes		
Pit2	Sag	City of Char	Charles Stu	0.559	2.2	2.16	0.2	0	0.5	271973.2	6137172	No	1	1 x Ku	No	Existing		No	0.2	0.2
JB6	OnGrade	Junction Pit	Junction Pit or Manhole		0.9	2.61		0	0.2	271926.2	6137267	Yes	18	1 x Ku	No	Existing				
Pit17	OnGrade	GP	GP infi		1.4	2.48		0	0.2	271900.4	6137265	No	16	1 x Ku	No	Existing				
Pit226	OnGrade	GP	GP infi		2.2	2.42		0	0.2	271875.2	6137264	No	359601	1 x Ku	No	Existing				
N3	Node					0.5		0		271712.6	6137265		359610		No					
Pit10	Sag	GP	GP infi	10.758	4	2.31	0.39	0	0.5	272106.1	6137067	No	9	1 x Ku	No	Existing		No	0.39	0.39
Pit11	Sag	GP	GP infi	3	1.5	2.38	0.16	0	0.5	272101.6	6137085	No	10	1 x Ku	No	Existing		No	0.16	0.16
Pit5	Sag	GP	GP infi	1	1.7	2.33	0.15	0	0.5	272087.3	6137098	No	4	1 x Ku	No	Existing		No	0.15	0.15
Pit4	Sag	GP	GP infi	0.1	2.2	2.39	0.07	0	0.5	272078.2	6137098	No	3	1 x Ku	No	Existing		No	0.07	0.07
Pit15	OnGrade	GP	GP infi		4	2.59		0	0.2	272169.2	6137005	No	14	1 x Ku	No	Existing		No		
Pit44	Sag	GP	GP infi	1	1.6	2.58	0.05	0	0.5	272171.1	6136996	No	207	1 x Ku	No	Existing			0.05	0.05
Pit49	Sag	GP	GP infi	1	2	2.57	0.06	0	0.5	272164.3	6136984	No	220	1 x Ku	No	Existing		No	0.06	0.06
JB11	OnGrade	Junction Pit	Junction Pit or Manhole		0.9	2.807		0	0.2	272175.7	6136938	Yes	46703253	1 x Ku	No	New		No		
JB2	OnGrade	Junction Pit	Junction Pit or Manhole		1.6	2.8		0	0	272187.1	6136891	Yes	30	1 x Ku	No	Existing				
JB1	OnGrade	Junction Pit	Junction Pit or Manhole		2.2	3		0	0.2	272186	6136882	Yes	15	1 x Ku	No	Existing				
Pit142	OnGrade	GP	GP infi		1.6	2.4		0	0.2	272079.7	6136872	No	43430728	1 x Ku	No	Existing				
Pit160	OnGrade	GP	GP infi		1.5	2.378		0	0.2	271975.7	6136864	No	46703245	1 x Ku	No	New				
Pit102	OnGrade	GP	GP infi		1.7	2.16		0	0.2	271912.7	6136859	No	359406	1 x Ku	No	Existing		No		
A1-A	OnGrade	GP	GP infi		1.5	2.341		0	0.2	271903.1	6136964	No	46703218	1 x Ku	No	New				
Pit209	OnGrade	GP	GP infi		1.5	2.22		0	0.2	271889.6	6137079	No	54570843	1 x Ku	No	New				
Pit48	Sag	GP	GP infi	1	4	2.6	0.08	0	0.5	272155.1	6136982	No	218	1 x Ku	No	Existing			0.08	0.08
N101	Node					2.62		0		272057	6137280		617		No					
Pit23	OnGrade	Junction Pit	Junction Pit or Manhole		1	2.9		0	0.2	272057.1	6137278	Yes	22	1 x Ku	No	Existing		No		
JB5	OnGrade	Junction Pit	Junction Pit or Manhole		0.2	2.71		0	0.2	272038.5	6137276	Yes	7	1 x Ku	No	Existing				
JB8	OnGrade	Junction Pit	Junction Pit or Manhole		1.5	2.85		0	0.2	271961.7	6137270	Yes	855	1 x Ku	No	Existing				
N106	Node							0		271893.1	6137183		681		No					
Pit101	Sag	GP	GP infi	6757.5	4	3.67	0.15	0	0.5	272714	6136924	No	359374	1 x Ku	No	Existing		No	0.15	0.15
JB13	OnGrade	GP	GP infi		0.9	3.45		0	0.2	272643.9	6136918	No	46703497	1 x Ku	No	New		No		
Pit100	OnGrade	GP	GP infi		1.5	3.08		0	0.2	272519.2	6136909	No	359385	1 x Ku	No	Existing		No		
JB12	OnGrade	GP	GP infi		2.2	2.82		0	0.2	272407.6	6136899	No	46703483	1 x Ku	No	New		No		
Pit178	OnGrade	GP	GP infi		1.4	2.69		0	0.2	272203.7	6136883	No	49659792	1 x Ku	No	Existing		No		
Pit2255	Sag	GP	GP infi	6944.4	4	4	0.15	0	0.5	272693.1	6137330	No	359468	1 x Ku	No	Existing		No	0.15	0.15
Pit22	OnGrade	GP	GP infi		1.5	3.8		0	0.2	272410.6	6137306	No	359474	1 x Ku	No	Existing		No		
JB10	OnGrade	GP	GP infi		1.5	3.2		0	0.2	272224.8	6137291	No	35300384	1 x Ku	No	Existing		No		
JB9	OnGrade	Junction Pit	Junction Pit or Manhole		0.9	3.2		0	0.2	272186.6	6137288	Yes	46703051	1 x Ku	No	New		No		
N20	Node					2.73		0		271960.7	6137280		46703145		No					
N198020	Node					2.6		0		272088.1	6136992		46703222		No					
A-6	OnGrade	GP	GP infi		2.9	2.582		0	0.2	272091.5	6136978	No	46703217	1 x Ku	No	New		No		
N198022	Node					2.37		0		272078.5	6136885		46703234		No					
K-2	OnGrade	City of Char	Charles Sturt Double Pi		3.2	2.658		0	0.2	272169.6	6136937	No	46703250	1 x Ku	No	New		No		
N2	Node					2.1		0		271911	6136789		1.02E+08		No					
N830795	Node					2.8		0		272182.8	6136939		1.53E+08		No					
Pit16	OnGrade	GP	GP infi		1.5	2.66		0	0.2	272058	6137271	No	1.71E+08	1 x Ku	No	Existing				

DETENTION BASIN DETAILS

Name	Elev	Surf. Area	Not Used	Outlet Type	K	Dia(mm)	Centre RL	Pit Family	Pit Type	x	y	HED	Crest RL	Crest Lengt	id
Basin4	1.1	1200		Culvert	0.5					271927.2	6137258	No			46703113
	1.378	1200													
	1.4	1200													
	1.478	1200													
	1.578	1200													
	1.678	1200													
	1.778	1200													
	2.71	1200													
Basin5	2.1	1400		Culvert	0.5					272188	6137268	No			46703044
	2.7	1400													
	3	1400													
Basin1	1.4	5		Culvert	0.5					271975.5	6136886	No			46703212
	1.5	377.497													
	1.6	424.459													
	1.7	472.436													
	1.8	521.582													
	1.9	572.008													
	2	623.72													
	2.1	662.273													
	2.2	701.352													
	2.3	741.807													
	2.4	795.511													
	2.5	1038.62													
	2.55	1242.26													
Basin2	1.975	650		Culvert	0.5					272404.5	6136929	No			46703484
	2.6	650													
	2.8	650													
	3.4	650													
Basin3	2.6	400		Culvert	0.5					272641.7	6136950	No			46703485
	3.8	400													

SUB-CATCHMENT DETAILS

Name	Pit or Node	Total Area (ha)	EIA %	Perv Area %	RIA %	EIA Time (min)	Perv Time (min)	RIA Time (min)	EIA Length (m)	Perv Length (m)	RIA Length (m)	EIA Slope(%) %	Perv Slope %	RIA Slope %	EIA Rough	Perv Rough	RIA Rough	Rainfall Multiplier
Cat7	Pit3	0.9	69.5	25.6	4.9	5	10	2										1
Cat6a	Pit6	0.134	71.9	17.5	10.5	5	10	2										1
Cat6	Pit2	1.182	64	26.4	9.6	5	10	2										1
Cat4	Basin4	0.753	34.9	58.8	6.3	5	10	2										1
Cat10	Pit10	0.5846	49.6	42.6	7.8	5	10	2										1
Cat9	Pit11	1.191	76.4	14.2	9.4	5	10	2										1
Cat7a	Pit5	0.652	72.9	16.5	10.6	5	10	2										1
Cat8	Pit4	0.38	74.9	17.3	7.7	5	10	2										1
Cat14	Pit15	0.805	69.4	25.2	5.4	5	10	2										1
Cat15	Pit44	0.546	88.1	5.9	5.9	5	10	2										1
Cat13a	Pit49	0.0554	100	0	0	5	10	2										1
Ext. Cat4	Pit160	4.233	60	25	15	18	33	18										1
Cat11e	Pit102	0.324	94.7	2.6	2.7	5	10	2										1
Cat10a	Pit209	1.175	77.1	15.8	7.1	5	10	2										1
Cat12	Pit48	0.182	87	6.5	6.5	5	10	2										1
Cat 2	N101	2.315	5.9	94.1	0	5	10	2										1
Cat3	N106	0.838	63	28	9	5	10	2										1
Ext. Cat3	Pit101	35.033	65.8	21.4	12.8	27	42	27										1
Cat16	Pit178	0.894	87.4	7.3	5.4	5	10	2										1
Ext. Cat2	Pit2255	14.134	65.8	21.4	12.8	27	42	27										1
Ext. Cat1	Pit22	3.301	65.4	21.6	13	10	25	10										1
Cat2a	JB10	2.872	77	18	5	5	10	2										1
Cat17	Basin5	7.19	74.9	19.1	6	5	10	2										1
Cat1	N20	2.484	64.8	26.2	9	5	10	2										1
Cat11b	Basin1	0.776	65.4	30	4.6	5	10	2										1
Cat10b	N198020	0.529	81.2	14	4.8	5	10	2										1
Cat11a	A-6	0.826	84.9	10.4	4.7	5	10	2										1
Cat11d	N198022	0.57	85.5	8.3	6.2	5	10	2										1
Cat12a	K-2	0.188	85.9	7	7	5	10	2										1
Cat18	Basin2	6.543	73.4	21.3	5.3	5	10	2										1
Cat18a	Basin3	3.196	84	14.5	1.5	5	10	2										1
Cat13	N830795	0.7413	69.4	25.2	5.4	5	10	2										1
Cat5	Pit16	0.9	81.6	13.3	5.1	5	10	2										1

PIPE DETAILS

Name	From	To	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Type	Dia (mm)	I.D. (mm)	Rough	Pipe Is	No. Pipes	Chg From	At Chg	Chg (m)	RI (m)	Chg (m)	RL (m)	etc (m)
Pipe6	Pit3	Pit6	7.554	1.67	1.308	4.79	Concrete, u	450	450	0.013	NewFixed	1	Pit3		0				
Pipe7	Pit6	JB3	18.346	1.308	1.271	0.2	Box culvert:	0.9W x 0.6H		0.012	NewFixed	1	Pit6		0				
Pipe211268	JB3	Pit2	75.732	1.271	1.12	0.2	Concrete, u	750	750	0.013	New	1	JB3		0				
Pipe211269	Pit2	Basin4	10	1.12	1.1	0.2	Concrete, u	750	750	0.013	New	1	Pit2		0				
Pipe1741196	Basin4	JB6	12	1.1	1.04	0.5	Concrete, u	225	225	0.013	New	1	Basin4		0				
Pipe15	JB6	Pit17	24.641	0.416	0.342	0.3	Box culvert:	1.2W x 0.75H		0.012	Existing	1	JB6		0				
Pipe16	Pit17	Pit226	24.626	0.342	0.268	0.3	Box culvert:	1.2W x 0.75H		0.012	Existing	1	Pit17		0				
Pipe3422	Pit226	N3	702	0.268	-1.136	0.2	Box culvert:	1.2W x 0.75H		0.012	Existing	1	Pit226		0				
Pipe8	Pit10	Pit11	17.18	1.607	1.555	0.3	Box culvert:	0.6W x 0.45H		0.012	NewFixed	1	Pit10		0				
Pipe9	Pit11	Pit5	18.427	1.555	1.5	0.3	Box culvert:	0.6W x 0.45H		0.012	NewFixed	1	Pit11		0				

Pipe4	Pit5	Pit4	8.7	1.5	1.474	0.3	Box culvert:	0.6W x 0.45H			0.012	NewFixed	1	Pit5	0
Pipe5	Pit4	Pit6	63.632	1.474	1.308	0.26	Box culvert:	0.9W x 0.6H			0.012	NewFixed	1	Pit4	0
Pipe10	Pit15	Pit44	8.909	2.015	1.97	0.51	Box culvert:	0.45W x 0.225H			0.012	Existing	1	Pit15	0
Pipe136	Pit44	Pit49	13	1.97	1.79	1.38	Box culvert:	0.45W x 0.3H			0.012	Existing	1	Pit44	0
Pipe174291	Pit49	JB11	50	1.79	1.6	0.38	Concrete, u		525	525	0.013	New	1	Pit49	0
Pipe174292	JB11	JB2	45	1.596	1.425	0.38	Concrete, u		525	525	0.013	New	1	JB11	0
Pipe26	JB2	JB1	9.054	1.425	1.38	0.5	Concrete, u		525	525	0.013	New	1	JB2	0
Pipe138	JB1	Pit142	106.5	1.38	1.26	0.11	Box culvert:	1.35W x 0.675H			0.012	Existing	1	JB1	0
Pipe23	Pit142	Pit160	93.78	1.25	1.031	0.23	Box culvert:	1.35W x 0.675H			0.012	Existing	1	Pit142	0
Pipe22	Pit160	Pit102	74.17	1.031	0.853	0.24	Box culvert:	1.35W x 0.675H			0.012	Existing	1	Pit160	0
Pipe237	Pit102	A1-A	94	0.853	0.759	0.1	Concrete, u		600	600	0.013	Existing	2	Pit102	0
P238	Pit102	A1-A	94	0.853	0.759	0.1	Concrete, u		750	750	0.013	Existing	1	Pit102	0
Pipe174355	A1-A	Pit209	114	0.759	0.577	0.16	Concrete, u		600	600	0.013	Existing	2	A1-A	0
P238111	A1-A	Pit209	114	0.759	0.577	0.16	Concrete, u		750	750	0.013	Existing	1	A1-A	0
Pipe174356	Pit209	Pit226	196	0.577	0.268	0.16	Concrete, u		600	600	0.013	Existing	2	Pit209	0
P238119	Pit209	Pit226	196	0.577	0.268	0.16	Concrete, u		750	750	0.013	Existing	1	Pit209	0
Pipe135	Pit48	Pit49	8	1.97	1.89	1	Box culvert:	0.45W x 0.225H			0.012	Existing	1	Pit48	0
Pipe19	N101	Pit23	2.386	1.895	1.883	0.5	Concrete, u		300	300	0.013	Existing	1	N101	0
Pipe236	Pit23	JB5	18	0.842	0.752	0.5	Concrete, u		825	825	0.013	Existing	1	Pit23	0
Pipe14	JB5	JB8	77	0.752	0.521	0.3	Box culvert:	1.2W x 0.75H			0.012	Existing	1	JB5	0
Pipe179094	JB8	JB6	35	0.521	0.416	0.3	Box culvert:	1.35W x 0.675H			0.012	Existing	1	JB8	0
Pipe37	Pit101	JB13	76	2.02	1.891	0.17	Concrete, u		900	900	0.013	Existing	1	Pit101	0
Pipe36	JB13	Pit100	111	1.888	1.699	0.17	Concrete, u		900	900	0.013	Existing	1	JB13	0
Pipe35	Pit100	JB12	117.8	1.699	1.582	0.1	Concrete, u		900	900	0.013	Existing	1	Pit100	0
Pipe32	JB12	Pit178	184.72	1.582	1.397	0.1	Concrete, u		900	900	0.013	Existing	1	JB12	0
Pipe31	Pit178	JB1	16.88	1.397	1.38	0.1	Concrete, u		900	900	0.013	Existing	1	Pit178	0
Pipe404	Pit2255	Pit22	258	2.699	1.925	0.3	Concrete, u		825	825	0.013	Existing	1	Pit2255	0
Pipe109	Pit22	JB10	197.345	1.925	1.333	0.3	Concrete, u		825	825	0.013	Existing	1	Pit22	0
Pipe175	JB10	JB9	26.572	1.333	1.253	0.3	Concrete, u		825	825	0.013	Existing	1	JB10	0
Pipe174	JB9	Pit23	137.128	1.253	0.842	0.3	Concrete, u		825	825	0.013	Existing	1	JB9	0
Pipe174165	Basin5	JB9	14.14	2.1	2.029	0.5	Concrete, u		225	225	0.013	New	1	Basin5	0
Pipe480	N20	JB8	9.5	1.55	1.455	1	Concrete, u		300	300	0.013	Existing	1	N20	0
Pipe34	Basin1	Pit160	19.719	1.4	1.341	0.3	Concrete, u		375	375	0.013	New	1	Basin1	0
Pipe174233	N198020	A-6	10	1.893	1.843	0.5	Concrete, u		375	375	0.013	New	1	N198020	0
Pipe17	A-6	A1-A	185.243	1.843	1.28	0.3	Concrete, u		375	375	0.013	New	1	A-6	0
Pipe174234	N198022	Pit142	10	1.3	1.25	0.5	Concrete, u		375	375	0.013	New	1	N198022	0
Pipe82	K-2	JB11	8.706	1.901	1.875	0.3	Concrete, u		375	375	0.013	New	1	K-2	0
Pipe33	Basin2	JB12	15	1.975	1.9	0.5	Concrete, u		225	225	0.013	New	1	Basin2	0
Pipe174388	Basin3	JB13	15	2.6	2.525	0.5	Concrete, u		225	225	0.013	New	1	Basin3	0
Pipe81	N830795	JB11	10	1.646	1.596	0.5	Concrete, u		375	375	0.013	New	1	N830795	0
Pipe20	Pit16	Pit23	6.872	1.917	1.883	0.49	Concrete, u		300	300	0.013	Existing	1	Pit16	0

DETAILS of SERVICES CROSSING PIPES

Pipe	Chg (m)	Bottom Elev (m)	Height of Se (m)	Chg (m)	Bottom Elev (m)	Height of Se (m)	Chg (m)	Bottom Elev (m)	Height of Se (m)	etc etc

CHANNEL DETAILS

Name	From	To	Type	Length (m)	U/S IL (m)	D/S IL (m)	Slope (%)	Base Width (m)	L.B. Slope (1:?)	R.B. Slope (1:?)	Manning n	Depth (m)	Roofed

OVERFLOW ROUTE DETAILS

Name	From	To	Travel Time (min)	Spill Level (m)	Crest Length (m)	Weir Coeff. C	Cross Section	Safe Depth Major Storm (m)	SafeDepth Minor Storm (m)	Safe DxV (sq.m/sec)	Bed Slope (%)	D/S Area Contributing %	id	U/S IL	D/S IL	Length (m)
OF116	Pit3	Pit6	0.1				7.5 m roadv	0.3	0.15	0.4	2.18	0	1036	2.45	2.28	7.8
OF119	Pit6	Pit2	1.4				7.5 m roadv	0.3	0.15	0.4	0.23	45	1039	2.36	2.16	88.2
OF135324	Pit2	Basin4	1.4				10m wide p	0.15	0.15	0.4	0.12	0	47492056	2.36	2.3	52.08
OF132293	Basin4	Pit17	0.2	2.71	24	1.7	4 m wide pa	0.3	0.15	0.4	0.84	0	46703626	2.71	2.48	27.4
OF58	Pit17	Pit226	0.3				4 m wide pa	0.3	0.15	0.4	0.24	0	894	2.48	2.42	24.626
OF1765	Pit226	N3	8.6				4 m wide pa	0.3	0.15	0.4	0.27	0	359629	2.42	0.5	702
OF90	Pit10	Pit11	0.1				4 m wide pa	0.3	0.15	0.4	1.8	5	993	2.7	2.38	17.8
OF94	Pit11	Pit5	0.2				4 m wide pa	0.3	0.15	0.4	0.93	4	998	2.53	2.33	21.6
OF85	Pit5	Pit3	0.9				7.5 m roadv	0.3	0.15	0.4	0.3	40	986	2.48	2.28	67.2
OF86	Pit4	Pit6	0.9				7.5 m roadv	0.3	0.15	0.4	0.29	0	987	2.46	2.28	66.2
OF28	Pit15	Pit10	1.3				7.5 m roadv	0.3	0.15	0.4	0.3	50	769	2.59	2.31	92.7
OF107	Pit44	Pit49	0.2				7.5 m roadv	0.3	0.15	0.4	0.41	5	1015	2.63	2.57	14.8
OF42	Pit49	Pit44	0.2				7.5 m roadv	0.3	0.15	0.4	0.34	0	787	2.63	2.58	14.8
OF132280	Pit142	Pit160	2.6				8.2m Glenb	0.225	0.225	0.6	0.17	0	46703412	2.4	2.378	99.6
OF132	Pit160	Pit102	1.9				8.2m Glenb	0.225	0.225	0.6	0.17	0	46703422	2.378	2.16	74.2
OF_dummy	Pit102	N2	0.1				7.5 m roadv	0.3	0.15	0.4	0.6	0	359454	2.16	2.1	10
OF132270	A1-A	Pit102	1.6				7.5 m roadv	0.3	0.15	0.4	0.19	0	46703229	2.341	2.16	94
OF176093	Pit209	Pit102	9.1				7.5 m roadv	0.3	0.15	0.4	0.03	0	54570866	2.22	2.16	208
OF132269	Pit48	A-6	1.2				7.5 m roadv	0.3	0.15	0.4	0.15	0	46703224	2.68	2.582	63.6
OF6	N106	Pit226	2.5				7.5 m roadv	0.3	0.15	0.4	0.24	0	684	2.8	2.42	160
OF725457	Pit101	JB13	1.2				8.2m Glenb	0.225	0.225	0.6	0.49	0	1.87E+08	3.82	3.45	76
OF725459	JB13	Pit100	2.1				8.2m Glenb	0.225	0.225	0.6	0.33	0	1.87E+08	3.45	3.08	111
OF150569	Pit100	JB12	3.1				8.2m Glenb	0.225	0.225	0.6	0.17	0	50204107	3.08	2.82	117.8
OF150572	JB12	Pit178	4.8				8.2m Glenb	0.225	0.225	0.6	0.17	0	50204110	2.82	2.69	184.7
OF1474	Pit178	Pit142	3.2				8.2m Glenb	0.225	0.225	0.6	0.17	0	49659841	2.69	2.4	123.4
OF1756	Pit2255	Pit22	9.2				7m Pedlar S	0.24	0.24	0.6	0.08	2.5	359539	4	3.8	258
OF89542	Pit22	JB10	3.7				7m Pedlar S	0.24	0.24	0.6	0.3	0	36971199	3.8	3.2	197.3
OF475691	JB10	Basin5	3.5				4 m wide pa	0.3	0.15	0.4	0.11	0	1.33E+08	3.2	3	185.9
OF132298	Basin5	Pit16	2.2	3	10	1.7	7m Pedlar S	0.24	0.24	0.6	0.29	25	46703641	3	2.66	118.7
OF725454	Basin1	Pit160	0.2	2.55	15	1.7	4 m wide pa	0.3	0.15	0.4	0.87	0	1.87E+08	2.55	2.378	19.7
OF132277	A-6	A1-A	3.9				7.5 m roadv	0.3	0.15	0.4	0.13	0	46703359	2.582	2.341	185.2
OF132274	K-2	Pit48	1				7.5 m roadv	0.3	0.15	0.4	0.13	0	46703323	2.658	2.6	45.8
OF725451	Basin2	JB12	0.1	3.4	15	1.7	4 m wide pa	0.3	0.15	0.4	3.87	0	1.87E+08	3.4	2.82	15
OF725466	Basin3	JB13	0.1	3.8	20	1.7	4 m wide pa	0.3	0.15	0.4	2.33	0	1.87E+08	3.8	3.45	15
OF679583	Pit16	Basin4	1.1				7m Pedlar S	0.24	0.24	0.6	0.18	0	1.71E+08	2.66	2.58	45

PIPE COVER DETAILS

Name	Type	Dia (mm)	Safe Cover	Cover (m)	
Pipe6	Concrete, u	450	0.6	0.12	Unsafe
Pipe7	Box culvert:	0	0.6	0.27	Unsafe
Pipe211268	Concrete, u	750	0.6	0.23	Unsafe
Pipe211269	Concrete, u	750	0.6	-0.81	Unsafe
Pipe174196	Concrete, u	225	0.6	-0.26	Unsafe
Pipe15	Box culvert:	0	0.6	1.28	
Pipe16	Box culvert:	0	0.6	1.28	
Pipe3422	Box culvert:	0	0.6	0.78	
Pipe8	Box culvert:	0	0.6	0.1	Unsafe
Pipe9	Box culvert:	0	0.6	0.23	Unsafe
Pipe4	Box culvert:	0	0.6	0.23	Unsafe
Pipe5	Box culvert:	0	0.6	0.21	Unsafe
Pipe10	Box culvert:	0	0.6	0.24	Unsafe
Pipe136	Box culvert:	0	0.6	0.2	Unsafe
Pipe174291	Concrete, u	525	0.6	0.21	Unsafe
Pipe174292	Concrete, u	525	0.6	0.64	
Pipe26	Concrete, u	525	0.6	0.81	
Pipe138	Box culvert:	0	0.6	0.36	Unsafe
Pipe23	Box culvert:	0	0.6	0.37	Unsafe
Pipe22	Box culvert:	0	0.6	0.52	Unsafe
Pipe237	Concrete, u	600	0.6	0.66	
P238	Concrete, u	750	0.6	0.5	Unsafe
Pipe174355	Concrete, u	600	0.6	0.94	
P238111	Concrete, u	750	0.6	0.77	
Pipe174356	Concrete, u	600	0.6	1	
P238119	Concrete, u	750	0.6	0.83	
Pipe135	Box culvert:	0	0.6	0.3	Unsafe
Pipe19	Concrete, u	300	0.6	0.39	Unsafe
Pipe236	Concrete, u	825	0.6	1.07	
Pipe14	Box culvert:	0	0.6	1.1	
Pipe179094	Box culvert:	0	0.6	1.41	
Pipe37	Concrete, u	900	0.6	0.59	Unsafe
Pipe36	Concrete, u	900	0.6	0.41	Unsafe
Pipe35	Concrete, u	900	0.6	0.27	Unsafe
Pipe32	Concrete, u	900	0.6	0.27	Unsafe
Pipe31	Concrete, u	900	0.6	0.32	Unsafe
Pipe404	Concrete, u	825	0.6	0.42	Unsafe
Pipe109	Concrete, u	825	0.6	0.98	
Pipe175	Concrete, u	825	0.6	0.98	
Pipe174	Concrete, u	825	0.6	1.06	
Pipe174165	Concrete, u	225	0.6	-0.26	Unsafe
Pipe480	Concrete, u	300	0.6	0.85	
Pipe34	Concrete, u	375	0.6	-0.41	Unsafe
Pipe174233	Concrete, u	375	0.6	0.3	Unsafe
Pipe17	Concrete, u	375	0.6	0.33	Unsafe
Pipe174234	Concrete, u	375	0.6	0.66	
Pipe82	Concrete, u	375	0.6	0.35	Unsafe
Pipe33	Concrete, u	225	0.6	-0.26	Unsafe
Pipe174388	Concrete, u	225	0.6	-0.26	Unsafe
Pipe81	Concrete, u	375	0.6	0.74	
Pipe20	Concrete, u	300	0.6	0.41	Unsafe

These pipes have non-return valves: Pipe174196

DRAINS POST-DEVELOPMENT 1% AEP STORM EVENTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS

Name	Max HGL	Max Pond HGL	Max Surfac Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Pit3	2.82	2.82	0.65	0.9	0	0.36	Outlet System
Pit6	2.82	2.82	0.633	0.9	0	0.335	Outlet System
JB3	2.82		0		0		Outlet System
Pit2	2.81	2.82	0.705	0.6	0	0.482	Outlet System
JB6	2.71		0		0		Outlet System
Pit17	2.6		0.814		0	0.31	Outlet System
Pit226	2.46		0.614		0	0.001	Outlet System
N3	-0.3		0.155				
Pit10	2.82	2.83	0.387	10.8	0	0.116	Outlet System
Pit11	2.82	2.83	0.442	2.6	0	0.251	Outlet System
Pit5	2.82	2.83	0.536	0.9	0	0.291	Outlet System
Pit4	2.82	2.82	0.147	0.1	0	0.037	Outlet System
Pit15	2.84		0.282		0	0.175	Outlet System
Pit44	2.81	2.83	0.197	0.9	0	0.048	Outlet System
Pit49	2.82	2.84	0.072	0.9	0	0	Outlet System
JB11	2.82		0		0		Outlet System
JB2	2.81		0		0		Outlet System
JB1	2.81		0		0.19		None
Pit142	2.73		1.779		0	0.983	Outlet System
Pit160	2.6		2.255		0	1.04	Outlet System
Pit102	2.78		2.238		0	1.694	Outlet System
A1-A	2.5		0.406		0	0.144	Outlet System
Pit209	2.47		0.465		0	0.139	Outlet System
Pit48	2.81	2.8	0.175	0.9	0	0.068	Outlet System
N101	3.22		0.336				
Pit23	3.05		0		0		Outlet System
JB5	2.91		0		0		Outlet System
JB8	2.85		0		0		Outlet System
N106	2.97		0.276				
Pit101	4.66	3.83	4.953	5791.5	0	0.05	Outlet System
JB13	3.63		1.138		0	0.237	Outlet System
Pit100	3.9		0.591		0	0.19	Outlet System
JB12	3.1		2.335		0	1.019	Outlet System
Pit178	2.93		2.471		0	0.867	Outlet System
Pit2255	4.56	4.07	1.998	5594.3	0	0.119	Outlet System
Pit22	3.9		0.836		0	0.002	Outlet System
JB10	3.38		1.115		0	0.323	Outlet System
JB9	3.25		0		0		Outlet System
N20	7.29		0.842				
N198020	3.02		0.217				
A-6	2.89		0.354		0	0.245	Outlet System
N198022	2.8		0.249				
K-2	2.82		0.083		0	0.045	Outlet System
N830795	2.9		0.259				
Pit16	3.71		2.756		0	1.271	Outlet System

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Cat7	0.292	0.292	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat6a	0.045	0.045	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat6	0.353	0.353	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat4	0.123	0.123	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat10	0.135	0.135	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat9	0.425	0.425	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat7a	0.222	0.222	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat8	0.133	0.133	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat14	0.261	0.261	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat15	0.224	0.224	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat13a	0.026	0.026	0	5	2	10	1% AEP, 5 min burst, Storm 1
Ext. Cat4	0.643	0.643	0.01	18	18	33	1% AEP, 20 min burst, Storm 6
Cat11e	0.143	0.143	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat10a	0.423	0.423	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat12	0.074	0.074	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat 2	0.281	0.051	0.264	5	2	10	1% AEP, 2 hour burst, Storm 3
Cat3	0.246	0.246	0	5	2	10	1% AEP, 5 min burst, Storm 1
Ext. Cat3	4.656	4.646	0.305	27	27	42	1% AEP, 30 min burst, Storm 4
Cat16	0.364	0.364	0	5	2	10	1% AEP, 5 min burst, Storm 1
Ext. Cat2	1.878	1.874	0.123	27	27	42	1% AEP, 30 min burst, Storm 4
Ext. Cat1	0.745	0.745	0	10	10	25	1% AEP, 10 min burst, Storm 6
Cat2a	1.032	1.032	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat17	2.514	2.514	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat1	0.751	0.751	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat11b	0.237	0.237	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat10b	0.2	0.2	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat11a	0.327	0.327	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat11d	0.227	0.227	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat12a	0.075	0.075	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat18	2.241	2.241	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat18a	1.253	1.253	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat13	0.24	0.24	0	5	2	10	1% AEP, 5 min burst, Storm 1
Cat5	0.343	0.343	0	5	2	10	1% AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe6	0.111	0.7	2.816	2.816	1% AEP, 10 min burst, Storm 6
Pipe7	0.534	0.99	2.815	2.815	1% AEP, 10 min burst, Storm 6
Pipe211268	0.538	1.22	2.815	2.814	1% AEP, 10 min burst, Storm 6
Pipe211269	0.664	1.5	2.814	2.815	1% AEP, 10 min burst, Storm 3
Pipe174196	0.06	1.51	2.792	2.709	1% AEP, 1.5 hour burst, Storm 9
Pipe15	1.727	1.92	2.64	2.603	1% AEP, 10 min burst, Storm 3
Pipe16	1.688	1.88	2.497	2.459	1% AEP, 10 min burst, Storm 3
Pipe3422	1.647	1.83	2.085	-0.3	1% AEP, 2 hour burst, Storm 8

Pipe8	0.12	0.44	2.818	2.818	1% AEP, 15 min burst, Storm 3
Pipe9	0.196	0.72	2.817	2.817	1% AEP, 5 min burst, Storm 1
Pipe4	0.304	1.12	2.817	2.817	1% AEP, 5 min burst, Storm 1
Pipe5	0.345	0.64	2.816	2.816	1% AEP, 5 min burst, Storm 1
Pipe10	0.108	1.06	2.818	2.815	1% AEP, 5 min burst, Storm 1
Pipe136	0.151	1.12	2.815	2.816	1% AEP, 5 min burst, Storm 1
Pipe174291	0.234	1.08	2.816	2.819	1% AEP, 5 min burst, Storm 1
Pipe174292	0.391	1.81	2.818	2.813	1% AEP, 5 min burst, Storm 1
Pipe26	0.39	1.8	2.812	2.811	1% AEP, 5 min burst, Storm 1
Pipe138	0.738	0.81	2.771	2.73	1% AEP, 30 min burst, Storm 8
Pipe23	0.721	0.79	2.67	2.598	1% AEP, 1.5 hour burst, Storm 9
Pipe22	0.912	1	2.598	2.778	1% AEP, 10 min burst, Storm 4
Pipe237	0.499	0.88	2.695	2.502	1% AEP, 10 min burst, Storm 1
P238	0.419	0.9	2.676	2.502	1% AEP, 10 min burst, Storm 2
Pipe174355	0.534	0.94	2.495	2.472	1% AEP, 5 min burst, Storm 1
P238111	0.441	1	2.493	2.472	1% AEP, 5 min burst, Storm 1
Pipe174356	0.427	0.75	2.47	2.459	1% AEP, 2 hour burst, Storm 10
P238119	0.382	0.9	2.47	2.459	1% AEP, 10 min burst, Storm 2
Pipe135	0.071	0.7	2.814	2.816	1% AEP, 5 min burst, Storm 1
Pipe19	0.281	3.98	3.222	3.047	1% AEP, 2 hour burst, Storm 3
Pipe236	1.227	2.3	2.956	2.912	1% AEP, 5 min burst, Storm 1
Pipe14	1.081	1.2	2.905	2.854	1% AEP, 10 min burst, Storm 9
Pipe179094	1.701	1.87	2.756	2.709	1% AEP, 10 min burst, Storm 1
Pipe37	0.155	0.24	3.958	3.633	1% AEP, 15 min burst, Storm 6
Pipe36	0.74	1.16	3.633	3.899	1% AEP, 1 hour burst, Storm 1
Pipe35	0.619	0.97	3.625	3.104	1% AEP, 30 min burst, Storm 2
Pipe32	0.564	0.89	3.046	2.929	1% AEP, 30 min burst, Storm 5
Pipe31	0.693	1.09	2.838	2.811	1% AEP, 20 min burst, Storm 7
Pipe404	0.24	0.45	4.319	3.904	1% AEP, 10 min burst, Storm 3
Pipe109	0.643	1.2	3.789	3.381	1% AEP, 5 min burst, Storm 1
Pipe175	0.982	1.84	3.296	3.255	1% AEP, 5 min burst, Storm 1
Pipe174	0.947	1.77	3.214	3.047	1% AEP, 5 min burst, Storm 1
Pipe174165	0.06	1.51	3.27	3.255	1% AEP, 25 min burst, Storm 10
Pipe480	0.752	10.63	7.291	2.854	1% AEP, 5 min burst, Storm 1
Pipe34	0.158	1.43	2.591	2.598	1% AEP, 15 min burst, Storm 6
Pipe174233	0.201	1.82	3.018	2.888	1% AEP, 5 min burst, Storm 1
Pipe17	0.134	1.21	2.824	2.502	1% AEP, 5 min burst, Storm 1
Pipe174234	0.228	2.07	2.804	2.73	1% AEP, 5 min burst, Storm 1
Pipe82	0.11	0.99	2.817	2.819	1% AEP, 5 min burst, Storm 1
Pipe33	0.105	2.64	3.474	3.104	1% AEP, 2 hour burst, Storm 6
Pipe174388	0.098	2.46	3.866	3.633	1% AEP, 15 min burst, Storm 9
Pipe81	0.24	2.17	2.897	2.819	1% AEP, 5 min burst, Storm 1
Pipe20	0.164	2.32	3.263	3.047	1% AEP, 10 min burst, Storm 4

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF116	0.36	0.36	0.968	0.137	0.23	3.71	1.7	1% AEP, 10 min burst, Storm 3
OF119	0.335	0.395	1.261	0.593	0.15	8.85	0.87	1% AEP, 2 hour burst, Storm 8
OF135324	0.482	0.516	0.846	0.495	0.06	9.99	0.8	1% AEP, 2 hour burst, Storm 6
Weir1	0.605	0.605						1% AEP, 1.5 hour burst, Storm 5
OF132293	0.403	0.403	1.483	0.102	0.12	4	1.16	1% AEP, 2 hour burst, Storm 8
OF58	0.31	0.31	1.477	0.1	0.09	4	0.91	1% AEP, 2 hour burst, Storm 8
OF1765	0.001	0.009	1.521	0.052	0.01	4	0.66	1% AEP, 2 hour burst, Storm 8
OF90	0.116	0.117	1.458	0.34	0.04	4	0.89	1% AEP, 2 hour burst, Storm 10
OF94	0.251	0.259	1.485	0.43	0.08	4	0.99	1% AEP, 10 min burst, Storm 3
OF85	0.291	0.359	1.44	0.475	0.14	8.85	0.84	1% AEP, 10 min burst, Storm 6
OF86	0.037	0.087	1.416	0.483	0.05	8.85	0.57	1% AEP, 2 hour burst, Storm 8
OF28	0.175	0.136	1.44	0.425	0.11	8.85	0.76	1% AEP, 15 min burst, Storm 8
OF107	0.048	0.039	1.546	0.252	0.06	6.9	0.6	1% AEP, 5 min burst, Storm 1
OF42	0	0	1.533	0	0	0	0	
OF132280	0.983	1.028	0.795	0.271	0.19	15.27	0.88	1% AEP, 2 hour burst, Storm 8
OF132	1.04	1.039	0.795	0.234	0.19	15.27	0.88	1% AEP, 1.5 hour burst, Storm 9
OF_dummy	1.694	1.694	1.39	0.282	0.45	7.64	1.61	1% AEP, 2 hour burst, Storm 10
OF132270	0.144	0.161	1.146	0.227	0.1	6.29	0.75	1% AEP, 2 hour burst, Storm 10
OF176093	0.139	0.196	0.455	0.275	0.11	7.47	0.78	1% AEP, 2 hour burst, Storm 10
OF132269	0.068	0.089	1.018	0.156	0.08	4.5	0.67	1% AEP, 30 min burst, Storm 7
OF6	0.219	0.217	1.288	0.17	0.12	4.85	0.78	1% AEP, 10 min burst, Storm 4
OF725457	0.05	0.05	1.35	0.088	0.04	3.22	0.57	1% AEP, 2 hour burst, Storm 3
OF725459	0.237	0.165	1.108	0.147	0.1	6.07	0.75	1% AEP, 1 hour burst, Storm 3
OF150569	0.19	0.335	0.795	0.195	0.12	12.25	0.84	1% AEP, 20 min burst, Storm 7
OF150572	1.019	1.045	0.795	0.267	0.19	15.27	0.88	1% AEP, 30 min burst, Storm 7
OF1474	0.867	0.867	0.795	0.224	0.18	15.22	0.84	1% AEP, 2 hour burst, Storm 8
OF1756	0.119	0.119	0.625	0.144	0.07	5.16	0.68	1% AEP, 2 hour burst, Storm 5
OF89542	0.002	0.02	1.21	0.067	0.07	1.98	2.61	1% AEP, 15 min burst, Storm 10
OF475691	0.323	0.42	1	0.256	0.12	4	1.01	1% AEP, 2 hour burst, Storm 4
OF132298	1.24	1.267	1.19	0.243	0.23	15.05	0.94	1% AEP, 2 hour burst, Storm 4
OF725454	0.069	0.069	1.48	0.044	0.03	4	0.59	1% AEP, 2 hour burst, Storm 3
OF132277	0.245	0.23	0.948	0.194	0.13	5.46	0.81	1% AEP, 10 min burst, Storm 10
OF132274	0.045	0.045	0.948	0.091	0.05	2.16	0.59	1% AEP, 1.5 hour burst, Storm 9
OF725451	1.05	1.05	1.412	0.113	0.3	4	2.68	1% AEP, 1 hour burst, Storm 3
OF725466	0.676	0.676	1.435	0.102	0.2	4	1.94	1% AEP, 1 hour burst, Storm 1
OF679583	1.271	1.271	0.938	0.241	0.23	15.05	0.94	1% AEP, 2 hour burst, Storm 3

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin4	2.81	2057.6	1.068	0.06	1.008
Basin5	3.27	1643.7	1.3	0.06	1.24
Basin1	2.59	747.8	0.227	0.158	0.069
Basin2	3.55	1026.2	1.155	0.105	1.05
Basin3	3.92	526.6	0.773	0.098	0.676

Run Log for DRAINS v2023.11.8726.15750 - Seaton Postdevelopment_Rev2.6

{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Seaton Postdevelopment_Rev2.6.drn run at 10:35:59 on 19/3/2025 using Watercom Drains v2023.11.8726.15750

The maximum water level in these storages exceeds the maximum elevation you specified: Basin3, Basin2, Basin1, Basin4, Basin5.
DRAINS has extrapolated the Elevation vs Storage table to a higher Elevation. Please provide accurate values for higher elevations.
Upwelling occurred at 24 pits.
Freeboard was less than 0.15m at Pit16, Pit160, JB10, Pit226, Pit22
The maximum pond depth in these sag pits is unsafe: Pit101, Pit49, Pit48, Pit44, Pit11, Pit10, Pit6, Pit5, Pit4, Pit3, Pit2\line
The maximum flow in these overflow routes is unsafe: OF679583, OF150572, OF135324, OF132298, OF132, OF132280, OF_dummy, OF119, OF94, OF90, OF86, OF85, OF28

DRAINS POST-DEVELOPMENT 0.2EY STORM EVENTS

DRAINS results prepared from Version 2023.11.8726.15750

PIT / NODE DETAILS Version 8

Name	Max HGL	Max Pond HGL	Max Surface Flow Arrivir (cu.m/s)	Max Pond Volume (cu.m)	Min Freeboard (m)	Overflow (cu.m/s)	Constraint
Pit3	2.02	2.5	0.176	0.9	0.26	0.016	Inlet Capacity
Pit6	1.94	2.37	0.066	0.9	0.34	0	Inlet Capacity
JB3	1.89		0		0.76		None
Pit2	1.75	2.38	0.133	0.6	0.41	0.006	Inlet Capacity
JB6	1.36		0		1.25		None
Pit17	1.33		0		1.15	0	None
Pit226	1.29		0.108		1.13	0	None
N3	-0.3		0				
Pit10	2.08	2.44	0.112	0.3	0.23	0	Inlet Capacity
Pit11	2.07	2.63	0.207	2.6	0.31	0.07	Inlet Capacity
Pit5	2.05	2.57	0.189	0.9	0.28	0.042	Inlet Capacity
Pit4	1.98	2.5	0.067	0.1	0.41	0	Inlet Capacity
Pit15	2.66		0.131		0	0.03	Outlet System
Pit44	2.53	2.69	0.083	0.9	0.05	0.01	Inlet Capacity
Pit49	2.43	2.64	0.027	0.9	0.14	0	Inlet Capacity
JB11	2.28		0		0.53		None
JB2	1.92		0		0.88		None
JB1	1.77		0		1.23		None
Pit142	1.68		0		0.72	0	None
Pit160	1.65		0.299		0.73	0.002	Inlet Capacity
Pit102	1.61		0.072		0.55	0	None
A1-A	1.54		0.07		0.8	0	None
Pit209	1.45		0.212		0.77	0	None
Pit48	2.45	2.66	0.038	0.6	0.15	0	Inlet Capacity
N101	2.02		0.032				
Pit23	1.51		0		1.39		None
JB5	1.43		0		1.28		None
JB8	1.41		0		1.44		None
N106	2.93		0.123				
Pit101	2.24	3.8	2.152	4376.9	1.43	0	Inlet Capacity
JB13	2.17		0		1.28	0	None
Pit100	2.06		0		1.02	0	None
JB12	2		0		0.82	0	None
Pit178	1.82		0.183		0.87	0	None
Pit2255	2.86	4.07	0.868	1710.9	1.14	0.012	Inlet Capacity
Pit22	2.33		0.348		1.47	0	Inlet Capacity
JB10	1.99		0.517		1.21	0	Inlet Capacity
JB9	1.84		0		1.36		None
N20	2.77		0.376				
N198020	2.77		0.1				
A-6	2.69		0.15		0	0.025	Outlet System
N198022	1.68		0.114				
K-2	2.31		0.038		0.35	0.001	Inlet Capacity
N830795	2.32		0.12				
Pit16	2.46		0.15		0.2	0	None

SUB-CATCHMENT DETAILS

Name	Max Flow Q (cu.m/s)	EIA Max Q (cu.m/s)	Remaining Max Q (cu.m/s)	EIA Tc (cu.m/s)	RIA Tc (min)	PA Tc (min)	Due to Storm (min)
Cat7	0.124	0.124	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat6a	0.019	0.019	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat6	0.15	0.15	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat4	0.052	0.052	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat10	0.057	0.057	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat9	0.18	0.18	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat7a	0.094	0.094	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat8	0.056	0.056	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat14	0.11	0.11	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat15	0.095	0.095	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat13a	0.011	0.011	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Ext. Cat4	0.295	0.295	0	18	18	33	0.2EY AEP, 20 min burst, Storm 7
Cat11e	0.061	0.061	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat10a	0.179	0.179	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat12	0.031	0.031	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat 2	0.027	0.027	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat3	0.104	0.104	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Ext. Cat3	2.106	2.106	0	27	27	42	0.2EY AEP, 30 min burst, Storm 7
Cat16	0.154	0.154	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Ext. Cat2	0.85	0.85	0	27	27	42	0.2EY AEP, 30 min burst, Storm 7
Ext. Cat1	0.328	0.328	0	10	10	25	0.2EY AEP, 15 min burst, Storm 2
Cat2a	0.437	0.437	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat17	1.065	1.065	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat1	0.318	0.318	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat11b	0.1	0.1	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat10b	0.085	0.085	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat11a	0.139	0.139	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat11d	0.096	0.096	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat12a	0.032	0.032	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat18	0.949	0.949	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat18a	0.531	0.531	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat13	0.102	0.102	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1
Cat5	0.145	0.145	0	5	2	10	0.2EY AEP, 5 min burst, Storm 1

PIPE DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Max U/S HGL (m)	Max D/S HGL (m)	Due to Storm
Pipe6	0.085	0.8	1.955	1.941	0.2EY AEP, 10 min burst, Storm 3
Pipe7	0.341	0.64	1.9	1.889	0.2EY AEP, 15 min burst, Storm 9
Pipe21126	0.35	0.97	1.844	1.749	0.2EY AEP, 15 min burst, Storm 3
Pipe21126	0.468	1.4	1.704	1.632	0.2EY AEP, 10 min burst, Storm 3
Pipe17419	0.058	1.47	1.574	1.363	0.2EY AEP, 2 hour burst, Storm 3
Pipe15	0.842	0.94	1.342	1.33	0.2EY AEP, 10 min burst, Storm 3
Pipe16	0.867	0.96	1.3	1.289	0.2EY AEP, 10 min burst, Storm 3
Pipe3422	1.246	1.38	1.073	-0.3	0.2EY AEP, 30 min burst, Storm 6
Pipe8	0.055	0.2	2.073	2.071	0.2EY AEP, 10 min burst, Storm 8
Pipe9	0.139	0.51	2.054	2.045	0.2EY AEP, 10 min burst, Storm 3

Pipe4	0.224	0.83	1.993	1.982	0.2EY AEP, 10 min burst, Storm 3
Pipe5	0.248	0.56	1.963	1.941	0.2EY AEP, 10 min burst, Storm 3
Pipe10	0.098	0.97	2.554	2.532	0.2EY AEP, 5 min burst, Storm 1
Pipe136	0.143	1.06	2.465	2.426	0.2EY AEP, 5 min burst, Storm 1
Pipe17429	0.193	0.89	2.361	2.279	0.2EY AEP, 5 min burst, Storm 1
Pipe17429	0.313	1.48	2.175	1.918	0.2EY AEP, 5 min burst, Storm 1
Pipe26	0.319	1.85	1.918	1.77	0.2EY AEP, 5 min burst, Storm 1
Pipe138	0.388	0.76	1.758	1.678	0.2EY AEP, 1 hour burst, Storm 5
Pipe23	0.411	0.72	1.672	1.646	0.2EY AEP, 10 min burst, Storm 3
Pipe22	0.691	0.86	1.629	1.607	0.2EY AEP, 20 min burst, Storm 6
Pipe237	0.394	0.7	1.588	1.544	0.2EY AEP, 20 min burst, Storm 5
P238	0.282	0.6	1.584	1.544	0.2EY AEP, 20 min burst, Storm 6
Pipe17435	0.424	0.75	1.521	1.45	0.2EY AEP, 15 min burst, Storm 7
P238111	0.309	0.7	1.516	1.45	0.2EY AEP, 30 min burst, Storm 6
Pipe17435	0.363	0.64	1.425	1.289	0.2EY AEP, 20 min burst, Storm 7
P238119	0.331	0.8	1.418	1.289	0.2EY AEP, 30 min burst, Storm 9
Pipe135	0.03	0.29	2.43	2.426	0.2EY AEP, 5 min burst, Storm 1
Pipe19	0.027	0.96	2.023	2.01	0.2EY AEP, 5 min burst, Storm 1
Pipe236	0.68	1.57	1.465	1.432	0.2EY AEP, 15 min burst, Storm 7
Pipe14	0.679	0.84	1.429	1.406	0.2EY AEP, 15 min burst, Storm 7
Pipe17909	0.848	0.93	1.377	1.363	0.2EY AEP, 15 min burst, Storm 7
Pipe37	0.057	0.47	2.239	2.17	0.2EY AEP, 2 hour burst, Storm 3
Pipe36	0.128	0.75	2.17	2.061	0.2EY AEP, 1.5 hour burst, Storm 6
Pipe35	0.129	0.54	2.061	1.997	0.2EY AEP, 2 hour burst, Storm 7
Pipe32	0.225	0.79	1.997	1.822	0.2EY AEP, 2 hour burst, Storm 7
Pipe31	0.245	0.93	1.822	1.77	0.2EY AEP, 2 hour burst, Storm 3
Pipe404	0.034	0.46	2.86	2.334	0.2EY AEP, 2 hour burst, Storm 3
Pipe109	0.267	1.01	2.334	1.985	0.2EY AEP, 15 min burst, Storm 3
Pipe175	0.542	1.37	1.904	1.836	0.2EY AEP, 15 min burst, Storm 7
Pipe174	0.584	1.53	1.806	1.507	0.2EY AEP, 15 min burst, Storm 7
Pipe17416	0.059	1.61	2.678	2.224	0.2EY AEP, 2 hour burst, Storm 7
Pipe480	0.319	4.51	2.77	1.755	0.2EY AEP, 5 min burst, Storm 1
Pipe34	0.039	0.57	1.622	1.646	0.2EY AEP, 30 min burst, Storm 6
Pipe17423	0.088	0.8	2.77	2.691	0.2EY AEP, 5 min burst, Storm 1
Pipe17	0.124	1.49	2.498	1.544	0.2EY AEP, 10 min burst, Storm 3
Pipe17423	0.096	0.87	1.683	1.678	0.2EY AEP, 5 min burst, Storm 1
Pipe82	0.033	0.3	2.284	2.279	0.2EY AEP, 5 min burst, Storm 1
Pipe33	0.094	2.36	2.972	2.123	0.2EY AEP, 2 hour burst, Storm 7
Pipe17438	0.078	2.01	3.249	2.736	0.2EY AEP, 1 hour burst, Storm 8
Pipe81	0.103	0.93	2.318	2.279	0.2EY AEP, 5 min burst, Storm 1
Pipe20	0.117	1.82	2.217	2.141	0.2EY AEP, 5 min burst, Storm 1

CHANNEL DETAILS

Name	Max Q (cu.m/s)	Max V (m/s)	Due to Storm

OVERFLOW ROUTE DETAILS

Name	Max Q U/S	Max Q D/S	Safe Q	Max D	Max DxV	Max Width	Max V	Due to Storm
OF116	0.016	0.016	0.453	0.05	0.05	0.8	1.02	0.2EY AEP, 10 min burst, Storm 3
OF119	0	0.047	0.147	0.15	0.01	4.25	0.09	0.2EY AEP, 5 min burst, Storm 1
OF135324	0.006	0.002	0.846	0.011	0	4.89	0.33	0.2EY AEP, 15 min burst, Storm 3
Weir1								
OF132293	0	0	0.832	0	0	0	0	
OF58	0	0	0.445	0	0	0	0	
OF1765	0	0	0.472	0	0	0	0	
OF90	0	0.031	1.218	0.139	0.01	4	0.37	0.2EY AEP, 5 min burst, Storm 1
OF94	0.07	0.069	0.876	0.178	0.03	4	0.6	0.2EY AEP, 10 min burst, Storm 3
OF85	0.042	0.062	0.168	0.16	0.05	4.6	0.58	0.2EY AEP, 10 min burst, Storm 3
OF86	0	0	0.165	0	0	0	0	
OF28	0.03	0.042	0.168	0.08	0.04	1.81	0.55	0.2EY AEP, 10 min burst, Storm 8
OF107	0.01	0.01	0.197	0.062	0.03	1.19	0.46	0.2EY AEP, 10 min burst, Storm 8
OF42	0	0	0.179	0	0	0	0	
OF132280	0	0	0.795	0	0	0	0	
OF132	0.002	0.001	0.795	0.028	0.01	0.6	0.39	0.2EY AEP, 30 min burst, Storm 5
OF_dummy	0	0	0.238	0	0	0	0	
OF132270	0	0	0.134	0	0	0	0	
OF176093	0	0	0.053	0	0	0	0	
OF132269	0	0	0.119	0	0	0	0	
OF6	0.091	0.089	0.15	0.13	0.08	3.47	0.67	0.2EY AEP, 10 min burst, Storm 8
OF725457	0	0	1.35	0	0	0	0	
OF725459	0	0	1.108	0	0	0	0	
OF150569	0	0	0.795	0	0	0	0	
OF150572	0	0	0.795	0	0	0	0	
OF1474	0	0	0.795	0	0	0	0	
OF1756	0.012	0.012	0.625	0.069	0.02	2.05	0.46	0.2EY AEP, 2 hour burst, Storm 3
OF89542	0	0	1.21	0	0	0	0	
OF475691	0	0	0.301	0	0	0	0	
OF132298	0	0.026	1.19	0.079	0.03	2.49	0.51	0.2EY AEP, 10 min burst, Storm 3
OF725454	0	0	0.847	0	0	0	0	
OF132277	0.025	0.015	0.111	0.109	0.04	2.78	0.53	0.2EY AEP, 15 min burst, Storm 9
OF132274	0.001	0.001	0.111	0	0	0	0	0.2EY AEP, 5 min burst, Storm 1
OF725451	0	0	1.412	0	0	0	0	
OF725466	0	0	1.386	0	0	0	0	
OF679583	0	0	0.938	0	0	0	0	

DETENTION BASIN DETAILS

Name	Max WL	MaxVol	Max Q Total	Max Q Low Level	Max Q High Level
Basin4	1.63	638.2	0.058	0.058	0
Basin5	2.87	1080.4	0.059	0.059	0
Basin1	1.62	63.9	0.039	0.039	0
Basin2	3.18	785.7	0.094	0.094	0
Basin3	3.48	353	0.078	0.078	0

Run Log for DRAINS v2023.11.8726.15750 - Seaton Postdevelopment_Rev2.6

{\colortbl;\red0\green0\blue0;\red192\green0\blue0;}Run Log for DRAINS v2023.11.8726.15750 - Seaton Postdevelopment_Rev2.6.drn run at 10:31:25 on 19/3/2025 using Watercom Drains v2023.11.8726.15750

No water upwelling from any pit.
Freeboard was less than 0.15m at A-6, Pit49, Pit44, Pit15
The maximum flow in these overflow routes is unsafe: OF119, OF94, OF85